Journal
OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

General Articles

Trichomoniasis in an Artificial Insemination Bull Stud—*Gabel—Tharp—Thorne—Groves—Koutz—Amstutz* 119
Brucellosis in Veterinarians—*Harold J. Harris* 124

Surgery and Obstetrics

Hysterotomy to Obtain "Disease-Free" Baby Pigs—*Hoerlein—Adams—Meade* 127
Postparturient, Extrauterine Canine Fetus—*William H. Kuhlman and D. J. Kovan* 131

Clinical Data

A Preliminary Report on the Use of Meticorten in Bovine Ketosis—*Robert G. Morris and Charles E. Hall* 132
Antibiotic Resistance of Organisms Associated with Bovine Mastitis—*R. A. Huebner and Jane O. Scheetz* 135
Gapeworm (*Cyathostoma Bronchialis*) Infection in a Duck—*E. L. Stubbs* .. 138
The Incidence of Intestinal Helminths in Dogs and Cats in Knoxville, Tennessee—*H. Ciordia and A. W. Jones* 139
Protozoan Diarrhea in a Dog—*Frank A. Hayes and Charles C. King* 140
What Is Your Diagnosis? 141
Nocardiosis (Actinomycosis) in the Dog—*Lloyd C. Moss* 143
Excess Iodide as the Primary Cause of the Inhibition of Thyroid Uptake of Radioiodine Produced by Phenothiazine, N. F. (Green)—*Talmage—Benson—Szafir—Turner—Allen* 150
Allergy in a Horse—*Maplesden—Cote—Mitchell* 152
Fluid Replacement in the Treatment of Dehydration from Diarrhea in the Horse—*Michael Jastremski and Joseph W. Ferrebee* 153
Some Clinical Uses for *Rauwolfia Serpentina*—*H. M. Tabbut* 156
An Epithelial Ependymoma in an Ostrich—*Williamson—Simon—Hatton* .. 157
Radial Fracture Repair in a Heifer—*Paul Hoffman* 159

Editorial

Established and New Uses for Antibiotics 162
Obedience Training of Dogs Should Be Encouraged 163

The News ..... 169 **Organization Section ..... adv. p. 18**

Washington News, adv. p. 10; Coming Meetings, adv. p. 22

Contents continued on adv. pages 2 and 4

Vol. 128 **February 1, 1956** **No. 3**

Ask for Cor-Hepagen*

Corn States multiple canine vaccine

**Canine Distemper Vaccine and Infectious Canine Hepatitis Vaccine in Bronchisepticus-Streptococcus-Typhimurium Bacterin*

Cor-Hepagen is a virus-infected tissue suspension of antigens for the viruses of canine distemper and infectious canine hepatitis combined in a bacterin containing the organisms usually associated with these diseases (*Brucella bronchisepticus*, pyogenic *Streptococcus*, and *Salmonella typhimurium*).

In Cor-Hepagen the virus tissues and bacteria are formalin inactivated in a manner which preserves their maximum antigenicity.

Cor-Hepagen is available in packages of three 5 cc. vials, twenty-five 5 cc. vials, and a bulk 50 cc. vial.

Administer three 5 cc. doses subcutaneously at weekly intervals, using aseptic precautions. The 3 injections can be given between weaning and 4 months. Booster injections may be given at 6 months or a year.

protects against distemper, hepatitis, and secondary bacterial pathogens

Corn States LABORATORIES, INC.

1124 HARNEY ST. • OMAHA 8, NEBRASKA

Consistently good results in Ketosis therapy

INVERTOSE is an entirely new approach in ketosis therapy, based on an exclusive Norden process of blending two monosaccharides never before combined in an intravenous solution for veterinary medicine.

INVERTOSE combines the advantages of 25% fructose and 25% dextrose—permits more rapid assimilation and more uniform utilization than dextrose alone, with less stimulation to the pancreas and less danger of hypoglycemia. Higher blood levels, maintained longer, fewer relapses.

INVERTOSE is effective. Practitioners report consistently good results in ketosis therapy—even in severe cases. Also is a definite aid in the treatment of milk fever, shock, and other conditions requiring carbohydrate therapy.

Order a dozen of INVERTOSE—evaluate against your present ketosis treatment. Available from your nearest Norden branch or distributor. 12—500 cc vials .... $11.40.

INVERTOSE

Here's how you gain with Invertose:

INVERTOSE provides readily utilizable carbohydrates — more rapidly converted to liver glycogen.

INVERTOSE does not cause metabolic changes as do cortisone or ACTH.

INVERTOSE does not put increased energy requirements upon patients as do sodium acetate, sorbitol, sodium propionate, glycerol, etc.

INVERTOSE does not require insulin for metabolism hence less tendency to produce hypoglycemia and relapse.

NORDEN LABORATORIES Norden **Lincoln, Nebraska**

Journal of the American Veterinary Medical Association

CONTENTS

Continued from Cover

SURGERY AND OBSTETRICS

Effect of Alfalfa on Gilt Ovulation 130
Bovine Semen Production 131
Pregnancy and Cortisone 131
An Intravenous Needle Lock 131
Pituitary Changes in Cryptorchism 131
Whelping Temperature 131

CLINICAL DATA

Therapy for Amebiasis in Man 137
Fumagillin for Amebiasis in Man 137
Penicillin for Swine Erysipelas 137
Anemia in Ducks from Chloromycetin 138
Streptomycin for Infectious Coryza 138
Sense of Hearing in the Dog 139
Pulmonary Carcinomas of the Dog 139
Are Dogs Color Blind? 140
Antirabies Treatment 148
Rabies in Fowl in Germany 148
Rabid Rat Attacks Boy 148
Aujeszky's Disease in Georgia Swine 148
Temperature Effect on Chickens 148
Malayan Buffalo Husbandry 148
Terramycin for Fowl Cholera 148
Penicillin V per Os Is Effective 149
Milk Levels of Terramycin Following Infusions or Injections 149
Virus Pneumonia Effect on Pig Growth 149
Mules Escape Encephalomyelitis 149

OFFICERS: Floyd Cross, *President;* Brigadier General Wayne O. Kester, *President-Elect;* J. G. Hardenbergh, *Executive Secretary;* H. E. Kingman, Jr., *Assistant Executive Secretary;* H. E. Kingman, Jr., *Treasurer.*

EXECUTIVE BOARD: J. M. Arburua, *Chairman;* T. Lloyd Jones, *1st District;* S. F. Scheidy, *2nd District;* L. M. Hutchings, *3rd District;* R. S. Sugg, *4th District;* Frank B. Young, *5th District;* J. M. Arburua, *6th District;* Ernest C. Stone, *7th District;* W. G. Brock, *8th District;* Edwin Laitinen, *9th District;* W. O. Brinker, *10th District;* Floyd Cross, *ex officio;* Brigadier General Wayne O. Kester, *ex officio;* A. H. Quin, *ex officio.*

BOARD OF GOVERNORS: J. M. Arburua, *Chairman;* Floyd Cross, Brigadier General Wayne O. Kester (Committee on Journal).

EDITORIAL STAFF: W. A. Aitken, *Editor-in-Chief;* Wayne H. Riser, *Editor, Small Animal Medicine;* J. G. Hardenbergh, *Managing Editor,* Helen S. Bayless, *Assistant Editor and Advertising Manager;* Eva G. Bailey, *Assistant to the Editor;* L. A. Merillat, *Editor Emeritus.*

Associate Editors: Raymond Fagan, L. E. Fisher, Harry W. Johnson, Hadleigh Marsh, Paul Meginnis, J. D. Ray, S. J. Roberts, B. T. Simms, K. W. Smith, W. T. S. Thorp, Henry Van Roekel, Brigadier General Elmer W. Young.

FOREIGN LANGUAGE ABSTRACTING: K. F. Burns (Japanese); G. T. Edds and O. A. Lopez-Pacheco (Spanish); M. Erdheim (Hebrew); Ernest Froelich (Yugoslav); Robert E. Habel (Russian); F. Kral (German); O. A. Lopez-Pacheco (Spanish-Portuguese); W. A. Malmquist (Scandinavian); L. Van Es (Dutch); K. Zakrzewski (Polish); R. F. Vigue and Joseph P. Scott (French); Anthony Sunara (Italian).

$15.00 per Annum — Single Copies, $ .75 Prepaid in U.S.
Canada and Pan American Countries, $15.50; Foreign, $16.50
Published semimonthly at 600 S. Michigan Ave., Chicago 5, Ill., by the American Veterinary Medical Association. Second class mail privileges authorized at Chicago, Ill., January, 1956. Additional entry at Mendota, Ill.

season after season **Swivax®**

still the **hog cholera vaccine**

to use for

safety
economy
effectiveness

May be used with or without serum.

Minimizes post-vaccination difficulties.

One injection confers solid immunity for two years, probably longer.

Use with serum adds *immediate* protection to this long-lasting immunity.

Cannot infect premises with hog-cholera.

Cannot introduce other diseases to swine.

Successfully used on millions of swine during a number of successive vaccinating seasons.

—AND SOLD ONLY TO VETERINARIANS

Swivax®

HOG-CHOLERA VACCINE

Licensed under U. S. Patent 2518978

modified live virus · rabbit origin · vacuum dried

In 2 dose; 5 dose; 25 dose and 50 dose packages.

Pitman-Moore Company, Division of

ALLIED LABORATORIES, INC.

CONTENTS—Continued

Botulism in Young Pheasants 149
Study of Crystal Violet Vaccination 149
Pasteurella Multocida Typing Service 149
Antibiotics Affect Size of Chick Thyroid 151
Cortisone in Trichinella Infection 151
Actinomycosis in Ferrets 151
Albomycin, a New Russian Antibiotic 151
Antibiotics Do Increase Pig Crop 151
Feeding High Levels of Antibiotics 151
Antibiotics for "Sanitary" Pigs 151
A Test for Antibiotics in Milk 151
Enterotoxemia in Lambs 151
Hereditary Immunity of Calves to Aftosa .. 152
Erythromycin for Actinomycosis 155
Arsenic Poisoning in Milk Cows 155
Congenital Johne's Disease in a Calf 155
Swine Herds Free of Virus Pneumonia 155
Bovine Parasitism in the Southeast 155
Piperazine in Bran Mash for Horses 156
Penicillin for Equine Strangles 156
Penicillin V, a New Oral Type 156
Nutria Fur Farming 158
Induced Erysipelas-Arthritis in Pigs 158
Cows Sensitized to Tuberculosis 158
Adenocarcinoma of the Bovine Uterus 160
Psittacosis Virus in Diseased Cattle 160
Aftosa Appears in England 160
Mites and Equine Encephalomyelitis 160

NUTRITION

Role of Anemia in Vaccination Shock 161
Does Bracken Poisoning Kill Cattle? 161
Tocopheral Levels in Milk 161
Manganese Deficiency and Swine Bones .. 161
Stilbestrol in Fattening Bulls 161
Growth Standards for Dairy Cows 161

CURRENT LITERATURE

Abstracts—Laboratory Techniques for Isolation and Propagation of Vibrio from Cattle, 164; Reproductive Efficiency of Heifers with Vibrio Fetus, 164; Catarrhal Enteritis of Chicks Similar to Bluecomb Disease, 164; Evaluation of Fermentative Capacity of Erysipelothrix Rhusiopathiae, 164; Equine Infectious Anemia Epizootic in Mexico, 164; Isolation Equipment for Pigs, 165; Encephalitis in Dogs Produced by Distemper Virus, 165; Bacterial Permeation of the Gut Wall in Irradiated Burros, 165; Growth Characteristics of Foot-and-Mouth Disease Virus, 165; Effect of Antibiotics on Intestinal Sections of Rabbits and Swine, 166.

Foreign Abstracts—Cultivation of Herpes Virus in Tissue Culture, 166; Innervation of the Equine Heart, 166; Xenodiagnosis of Rubarth's Disease, 166; Irrigation of the Nasolacrimal Duct in the Ox, 166; Intramuscular Carbon Tetrachloride in Fascioliasis of Sheep, 167; Foot-and-Mouth Disease Vaccine, 167; The Value of Semen Freezing, 167.

Books and Reports—Obedience Training for Your Dog, 167; Classics of Biology, 167; Synopsis of Medicine, 168; The Body Fluids, 168; Turkey Management, 168; Regional and Applied Anatomy of the Domestic Animals, 168; Finches, 168.

THE NEWS

Public Health Conference 169
Dog Food Manufacturers Meet 169
Among the States and Provinces 169
Deaths 171

MISCELLANEOUS

Butter vs. Margarine Consumption, 123; Bovine Brucellosis Revaccination, 126; Reactions to Strain 19; Vaccine, 126; Experimental Fowl Typhoid Therapy, 126.

ORGANIZATION

Kodachrome Slides Available ..... adv. p. 18
Women's Auxiliary ..... adv. p. 18
Student Chapters ..... adv. p. 18

the NEW
and fully-proved
anticonvulsant

Mylepsin
TRADEMARK

(PRIMIDONE)

IN CANINE HYSTERIA AND OTHER NERVOUS DISORDERS

MYLEPSIN has proved conspicuously successful in relief of true epilepsy, epileptiform convulsions and hysteria, and a valuable aid in treatment of dogs suffering from encephalitis, distemper or hard-pad disease.

LOW TOXICITY Its toxicity is extremely low, providing a wide margin of safety. The suggested daily dosage of 0.25 Gm. (one tablet) per 10 lb. bodyweight, may be varied, if necessary, without risk.

WELL-TOLERATED Unlike the older anticonvulsants such as bromides, chloral hydrate and barbiturates, Mylepsin does not produce anorexia or depression, and may safely be used on pregnant animals.

Supplied in bottles of 100 and 1,000 tablets.
FORT DODGE LABORATORIES, INC., Fort Dodge, Iowa

FORT DODGE

. . . everlastingly in search of the surer, the safer

Associated Veterinary Laboratories

Guidepost to a larger

practice for you

Look ahead to the future of your practice. It is important that the products you use and dispense today, and the policies of the companies that supply them, will help strengthen client relationships, not undermine them.

When you buy from members of Associated Veterinary Laboratories* you deal with companies which maintain a strict, ethical sales policy. The companies sell *only* to veterinarians . . . never to the "shelf goods" outlets of the open market. They feel that this is sound business policy, because they believe thoroughly in the future of the veterinary profession, and that their future depends on your future.

They are helping to build that future by a nation-wide public relations campaign that educates the public to the many values of the veterinary service. When you place your orders, remember the companies listed below.

Associated Veterinary Laboratories, inc.

Sponsors of American Foundation for Animal Health

Corn States Laboratories, Inc.
Fort Dodge Laboratories, Inc.
Grain Belt Supply Co.
The Gregory Laboratory, Inc.
Jensen-Salsbery Laboratories, Inc.
Liberty Laboratories
The National Laboratories Corp.
Norden Laboratories
Pitman-Moore Co.
Sioux City Serum Co.
Sioux Falls Serum Co.
The Southwestern Serum Co.
Allied Laboratories, Inc.
Armour Veterinary Laboratories
Blue Cross Serum Co.
Corn Belt Laboratories, Inc.

Associated Veterinary Laboratories

now you can prevent relapses

in milk fever . . . PARTEROL*

WHAT IS PARTEROL?

Parterol is an oil-soluble steroid obtained by irradiating ergosterol.

WHAT WILL IT DO?

Parterol has specific action on blood calcium. Intramuscular or oral doses produce a rise of calcium in the blood and tissue.

HOW DOES IT RAISE THE BLOOD CALCIUM LEVEL?

By supplementing the hormone secreted by the parathyroid glands. This calcium-raising action of Parterol is produced by mobilizing calcium stored in the bones and increasing the absorption of calcium from the intestinal tract.

INDICATION AND DOSAGE:

To prevent relapses in milk fever by supplementing the parathyroid hormone during periods of stress on the calcium-regulating mechanisms due to increased demand for calcium at parturition. After treatment with calcium, Parterol should be given at the rate of 10 mg. per cow.

To prevent milk fever by regulating the calcium blood and tissue level at the critical calcium-utilization period at parturition. Parterol should be given 24 hours prior to parturition in a dosage of 10 mg.

PACKAGING:

Parterol is supplied in 30-cc. sterile vials. Each cc. contains 2.5 mg. Dihydrotachysterol in oil.

For further information, write

S. E. MASSENGILL COMPANY

Veterinary Division

Bristol, Tennessee

*Patent Applied for

News From Washington

Dr. B. T. Shaw, administrator, has directed establishment of an **animal disease reporting system** in the Agricultural Research Service. The Animal Disease Eradication Branch is charged with responsibility for collecting and correlating all animal disease morbidity and mortality information available to ARS; also for dissemination of such information in systematic reports to livestock and related industries, practicing veterinarians, and agencies of state and federal governments concerned with prevention, treatment, control, or eradication of animal diseases.

* * *

ARS, in cooperation with state livestock sanitary officials, is sponsoring **a series of six regional two-day meetings to discuss in detail exotic animal diseases** considered a potential threat to livestock and poultry and their similarity to endemic diseases in the United States. Details of the program will appear in the February 15 JOURNAL.

* * *

Senator Harry F. Byrd, chairman, Senate Finance Committee, is reported as stating that **several important issues have to be considered by the Committee ahead of the Social Security bill** (H.R. 7225). It is understood that hearings might get underway in late January or early February. The administration has some proposed changes to the bill, which Congress will soon receive. Senators comprising this committee are Democrats Harry F. Byrd (Va., chairman), Walter F. George (Ga.), Robert S. Kerr (Okla.), J. Allen Frear, Jr. (Del.), Russell B. Long (La.), George A. Smathers (Fla.), Lyndon B. Johnson (Tex.), Alben W. Barkley (Ky.), and Republicans Eugene D. Millikin (Colo.), Edward Martin (Pa.), John J. Williams (Del.), Ralph E. Flanders (Vt.), George W. Malone (Nev.), Frank Carlson (Kan.), and Wallace F. Bennett (Utah).

* * *

The new bill overhauling the **Civil Service Retirement System** is expected to be introduced early in January by Senator Olin D. Johnson (D S. Car.). It would boost annuities up to 33 per cent, provide earlier optional retirement, and increase disability and survivorship benefits. It is reported some supporters of the measure would be willing to increase employee contribution from 6 to 7 per cent to help finance the more liberal benefits.

* * *

Compilation by the Office of Education reveals that in the academic year 1954-1955, colleges and universities in the U. S. gave 354,445 earned degrees. Under healing arts and **medical sciences,** 23,299 received degrees of which **855 were in veterinary medicine.**

* * *

Dr. Lowell T. Coggeshall, dean of biological sciences, University of Chicago, has been appointed special assistant for Health and Medical Affairs on the staff of the Secretary, Department of Health, Education, and Welfare. Confirmation by the Senate is expected early in January.

SINGLE DOSE
Affiliated Brand

CANINE DISTEMPER VACCINE

Modified Live Virus—Chick-Embryo Origin—Desiccated

Induces Prompt, Enduring Immunity

Supplied in:
- Single dose package (Vaccine and Diluent)
- Package of 5—1 dose vials (Vaccine and Diluent)

Affiliated Brand Canine Distemper Vaccine, Modified Live Virus, Chick-Embryo Origin, Desiccated, is prepared from an attenuated strain of canine distemper virus grown on embryonated eggs.

A single 2cc dose injected into healthy animals induces a prompt immunity. It is well tolerated and will not produce distemper in healthy pups. Its potency and safety is determined by protection tests on highly susceptible animals such as ferrets or pups.

ALSO...
Affiliated Brand
RABIES VACCINE...

A Superior Type Giving Long Lasting Immunity!

Affiliated Brand Rabies Vaccine is prepared from the chick embryo adapted attenuated Flury strain of rabies virus . . . Experience indicates a single intramuscular injection of 3cc of Rabies Vaccine, modified live virus, chick embryo origin, induces a lasting immunity within 21 days after vaccination. This vaccine does not cause disease when injected and postvaccinal paralysis has never been observed.

Affiliated

AFFILIATED LABORATORIES CORPORATION

Grain Belt Supply Co.
Corn Belt Laboratories, Inc.
The National Laboratories Corp.
The Gregory Laboratory, Inc.

PRODUCED FOR AND SOLD TO GRADUATE VETERINARIANS ONLY

P.O.P. (Armour) secures its specific effects on the uterus and mammary glands without the pressor effects typical of unpurified or only partially purified posterior pituitary preparations. P.O.P. (Armour) minimizes in small animals the vomiting effect that less purified preparations impart.

Double action—Plus economy

P.O.P. (Armour) causes rapid and powerful uterine contractions of a rhythmic nature and exhibits milk-ejecting activity ("milk letdown"). Economy of treatment is another distinct advantage of P.O.P. (Armour). It contains 20 U.S.P. units of oxytocin, and less than 0.4 units of pressor activity per cc.—double U.S.P. strength.

Indications

Obstetrics (prepartum and postpartum); uterine hemorrhage; pyometra and chronic endometritis; lactation; stimulation of "milk letdown." A dramatic effect has been shown recently in the treatment of mastitis.

How supplied

In 5 cc. and 10 cc. multiple dose vials, 20 U.S.P. Units per cc.

*Armour's trade name for veterinary purified oxytocic principle preparation.

Sold to Graduate Veterinarians Only

VETERINARY ARMOUR LABORATORIES

A Division of Armour and Company • Kansas City 18, Kansas

whatever your choice may demand in
canine prophylactic or therapeutic measures,
these laboratory-proved and field tested
vaccines and serums by Fromm
serve you dependably—

distemper
hepatitis
leptospirosis

SOLD TO GRADUATE
VETERINARIANS ONLY

contact your nearest distributor

FROMM LABORATORIES, INC.
GRAFTON, WISCONSIN, U. S. A.

Your Symbol of Prestige for All to See

It is a mark of distinction to be a member of the American Veterinary Medical Association. Let your clients, friends, and colleagues know that you belong.

Place these AVMA membership emblems where others can see them. (All emblems come in a brilliant color combination of deep red, gold, and white.)

- AUTO EMBLEMS
  Solid metal and weather-resistant. Attaches to license plate or license-holder. 3½ inches in diameter. Price $2.50 each.
- DECALS
  Easy-to-apply on office doors or windows. 3½ inches in diameter. Price $.25 each.
- LAPEL PINS
  Satin-finish surface featuring the AVMA emblem. Popular screw-post design. Price $.60 each.

ORDER YOURS NOW

American Veterinary Medical Association
600 South Michigan Avenue
Chicago 5, Illinois

Please send, postage paid, the membership items checked:

..... (No.) AUTO EMBLEMS @ $2.50

..... (No.) DECALS @ $.25

..... (No.) LAPEL PINS @ $.60

( ) Payment enclosed ( ) Bill me

Name (please print) .....

Street .....

City ..... State .....

another

new addition to U. S. Chemical's

antibiotic combinations:

Neo-600

to help you fight stubborn bovine mastitis

Statistics show that organisms other than the more common streptococcus and staphylococcus are causing troublesome mastitis in today's herds, in ever-increasing numbers of cases. *Pseudomonas aeruginosa, Corynebacterium pyogenes, E. coli* and the *Proteus* groups are some of these organisms, which will not succumb to the more frequently-used antibiotics. We are also finding that staph and strep are becoming more resistant to conventional treatment.

NEO-600 contains more than 600 mg. of neomycin sulfate (equivalent to 350 mg. of neomycin base), which is the recommended dosage for the treatment of *Ps. aeruginosa, E coli, Str agalactiae, Str. dysagalactiae, Str. uberis* and *Micrococcus pyogenes* var. *aureous.*[1]

NEO-600 also contains 200,000 units of procaine penicillin G., and 100 mg. of dihydrostreptomycin (as sulfate). This combination produces apparent synergistic effects which each antibiotic given alone could not produce.[2] It covers the *widest possible anti-bacterial spectrum* and is indicated in every case of chronic or acute mastitis. It is also indicated in topical infections, such as skin infections, otitis externa, wound infections and furunculosis.

NEO-600 is a new and effective weapon in your fight against mastitis.

References:

[1] Drury, A.R.: Vet. Med. 47: 407-411, 1952.

[2] Kitchen, H., and Waksman, S.: J.A.V.M.A., Vol. 127, No. 942: 261-274, Sept., 1955.

SOLD TO GRADUATE VETERINARIANS ONLY

Each 11cc. NEO-600 tube and 11 cc. NEO-600 syringe contains:

neomycin sulfate	612.5 mg. (equivalent to 350 mg. of neomycin base)
procaine penicillin G	200,000 U.
dihydrostreptomycin (as sulfate)	100 mg.

Packaged in Boxes of 12

Prices

11 cc. Tubes:	$ 7.56 per doz.	63c. per tube
in 1-gross lots	86.40 per gross	60c. per tube
in 3-gross lots	77.76 per gross	54c. per tube
11 cc. Syringes:	$ 9.48 per doz.	79c. per syringe
in 1-gross lots	108.00 per gross	75c. per syringe
in 3-gross lots	97.20 per gross	67.5c. per syringe

Quantity prices are in effect in any combination of the eight different tubes and syringes offered by U. S. Chemical Co.

PLEASE WRITE FOR BULK DISCOUNT PRICES ON LOTS OF 5 GROSS OR MORE.

Additional 2% discount plus postpaid delivery on all orders accompanied by payment.

NO DETAIL MEN WILL CALL — ORDER DIRECTLY TODAY!

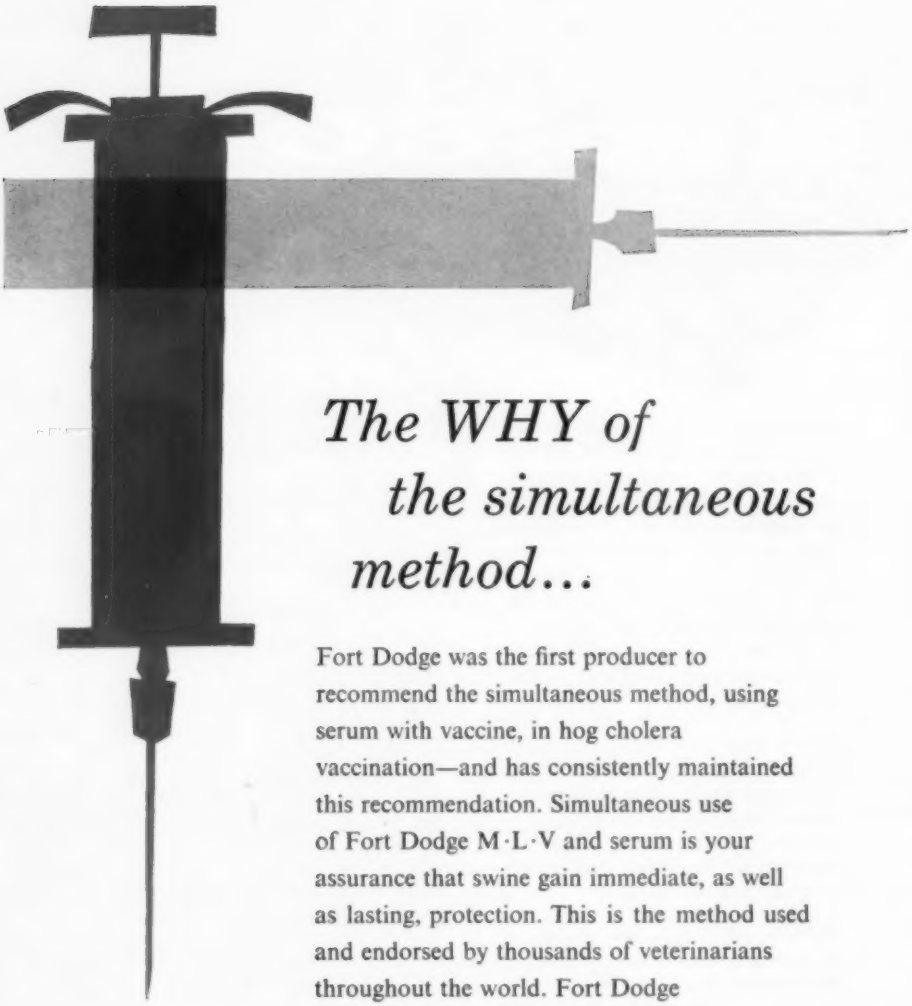
NEO-600 is not detailed, in order to hold its price at a level suited to the needs of veterinarians and farmers. It may be purchased by veterinarians only, on direct order from U. S. CHEMICAL CO., Inc.

Samples and literature available on request.

U. S. CHEMICAL CO., INC.

Department of Veterinary Medicine

Newington, Connecticut



The WHY of the simultaneous method...

Fort Dodge was the first producer to recommend the simultaneous method, using serum with vaccine, in hog cholera vaccination—and has consistently maintained this recommendation. Simultaneous use of Fort Dodge M·L·V and serum is your assurance that swine gain immediate, as well as lasting, protection. This is the method used and endorsed by thousands of veterinarians throughout the world. Fort Dodge Laboratories, Inc., Fort Dodge, Iowa.

M·L·V *The Original*

TRADE MARK

FORT DODGE ... EVERLASTINGLY IN SEARCH OF THE SURER, THE SAFER

JOURNAL
of the American Veterinary Medical Association
Chicago 5, Illinois

Vol. 128 FEBRUARY 1, 1956 No. 3
Copyright 1956 by the American Veterinary Medical Association

Trichomoniasis in an Artificial Insemination Bull Stud

A Clinical Report, Including Results of Diagnostic and Treatment Methods

A. A. GABEL, D.V.M.; V. L. THARP, D.V.M.; JOSEPH L. THORNE, D.V.M.; HAROLD F. GROVES, D.V.M., M.S.; F. R. KOUTZ, D.V.M., M.S.; HAROLD E. AMSTUTZ, D.V.M.

Columbus, Ohio

IT IS KNOWN that trichomoniasis can be transmitted from infected bulls to cows by artificial insemination.[1-6] Bartlett[5] reported that the rate of transmission may have been less than 1 per cent in a study of 23 infected bulls. The danger lies in herd sires becoming infected when they serve cows that have been previously artificially inseminated with infectious semen.[5]

Trichomonas foetus infection was found to be common in the bulls owned by an artificial insemination association. This report discusses: diagnostic methods used; finding the infection in the bull stud; dates and methods by which the infection was diagnosed (in 25 animals); method of treatment; results of treatment (17 cases); and the health program developed after the disease was found in the stud.

The infection was traced to the bull stud on Feb. 17, 1954, following the diagnosis of trichomoniasis in a cow with pyometra, which had been artificially inseminated. When the bull was found to be infected, testing of all the bulls in the stud was started immediately. During the following six months, trichomoniasis was diagnosed in 14 cows in nine herds in the ambulatory practice.

All of these cows had been artificially inseminated with semen from bulls later found to be infected. The semen had been diluted to 10 million spermatozoa per 0.8 ml., one-service vial, with citrate-egg yolk diluent containing 70,000 p.p.m. of penicillin and 70,000 μg. of streptomycin per 100 ml.

Diagnosis of the disease in cows was usually made by microscopic examination of the exudate from animals with pyometra. In a few cases, trichomonads were found by microscopic examination of aborted fetuses or fetal membranes.

DIAGNOSTIC METHODS

The dark-field method was used for the microscopic examinations. In the early part of the work, the test used was the direct microscopic examination of smegma obtained by the scraping method.[7-9] Later (in July), the scraping test was found to be unreliable in some bulls, especially those that had been treated. Bulls 6, 9, 13, and 18 had been treated but were positive on virgin heifer tests after several negative scraping tests (tables 1, 2, 3).

On August 4, the use of a modified preputial douche test similar to the one described by Fitzgerald *et al.*[10,11] was tried. A 22-inch plastic pipette,[9] used to introduce 50 ml. of sterile physiological saline solution into the prepuce, was then used to scrape the glans penis while an assistant held the end of the prepuce around the tube to prevent loss of the saline solution. The prepuce was massaged thoroughly, then the saline solution was withdrawn and centrifuged. The sediment was examined microscopically but cultures were not routinely made.

Bulls 8, 9,* 10, 16, and 17 were found positive by the preputial douche test after a number of negative scraping tests (tables 1, 3). Bulls negative on a series of preputial douche tests have not been found to be positive on the virgin heifer test. The preputial douche test for all routine test-

All of the authors are on the faculty of the College of Veterinary Medicine of the Ohio State University except Dr. Thorne, who is now at Utah State Agricultural College. Dr. Gabel is an ambulatory clinician; Dr. Tharp, director of clinic; Drs. Groves and Koutz, members of the parasitology department; and Dr. Amstutz, who was an ambulatory clinician in 1954, is now chairman of the Department of Veterinary medicine.

*Bull 9 was found positive on the virgin heifer test and the preputial douche test on the same day.

ing was started on August 11 and is being continued.

We believe that the culture test,[33-34] in which samples are obtained by the scraping method, compares favorably with the test conducted by examining, microscopically, the sediment from samples collected by the preputial douche method. This method requires considerable time for the preparation of culture tubes, but it proved of value when bulls were tested prior to purchase since it was inconvenient to examine the samples soon after collecting them.

In another method, the liner of the artificial vagina was removed immediately after service and rinsed with the liquid part of the culture medium which was then cultured and examined as usual.[4] A total of 34 liner culture tests were conducted on 5 bulls that had previously been found infected and were treated (tables 1, 3, bulls 1, 4, 5, 8, 16). One bull (16) had been tested five times with the liner culture method and extensively by other methods before again being found infected on a preputial douche test. Recently, bull 12 (known to be infected) was positive on the one-liner culture test conducted prior to treatment.

The virgin heifer test[18,19] has proved to be reliable but it is more time-consuming and expensive. It was used following treatment and a series of negative scraping or preputial douche tests. The bull being tested was permitted to breed the virgin heifer several times during an estrous period. Daily, from the tenth to the twenty-first day after the breeding date,[37,38] a sample of vaginal mucus from the heifer was examined microscopically. The sample was obtained by drawing 10 ml. of saline solution into a plastic pipette with a rubber bulb attached. The pipette was inserted into the vagina through a speculum,

TABLE 1—Bulls Treated Successfully—Data to Sept. 1, 1955

Bull (No.)	Date diagnosed	Date considered no longer infected	Months from diagnosis until considered no longer infected	No. of treatments	History of treatments and tests**
1	2/24/54	9/7/54	6½	1	Treated—32 neg. tests, 2 neg. virgin heifer tests, 33 neg. tests (11 neg. liner culture tests during Sept. and Oct.).
2	10/29/54	5/5/55	6¼	2	Treated twice *†—34 neg. tests.
3	9/27/54	4/11/55	6½	2	Treated twice *†—38 neg. tests.
4	2/27/54	11/12/54	8½	2	Treated—4 neg. tests, pos.; treated again—23 neg. tests (2 neg. liner culture tests during Oct.). Slaughtered Nov. 12 due to an injury.
5	3/12/54	11/4/54	7 2/3	2	Treated—pos.; treated again—28 neg. tests, 2 neg. virgin heifer tests, 30 neg. tests (10 neg. liner culture tests during Sept. and Oct.).
6	2/26/54	12/30/54	10	3	Treated—12 neg. tests, July 26 pos. on virgin heifer test; treated twice*—16 neg. tests, 2 neg. virgin heifer tests, 33 neg. tests.
7	2/18/54	2/8/55	11 2/3	3	Treated—13 neg. tests, Aug. 10 pos. on douche test (shortly after it was put into use); treated twice*—47 neg. tests.
8	2/24/54	11/24/54	9	4	Treated—pos.; treated—pos.; treated twice*—25 neg. tests, 2 neg. virgin heifer tests, 32 neg. tests (5 neg. liner culture test during Oct.).
9	2/17/54	2/8/55	11 2/3	4	Treated—3 neg. tests, pos.; treated—10 neg. tests, Aug. 9, pos. on virgin heifer test and douche test (same day); treated twice*—46 neg. tests.
10	2/19/54	1/20/55	11	5	Treated—2 neg. tests, pos.; treated twice—7 neg. tests, Aug. 11 pos. on douche test (shortly after it was put into use); treated twice*—14 neg. tests, 2 neg. virgin heifer tests, 44 neg. tests.
11	2/27/54	5/10/55	14½	8	Treated—pos.; treated—pos.; treated twice*—4 neg. tests, pos., treated twice*—pos.; treated twice*†—33 neg. tests.
12	4/12/55	Will be considered recovered after 8 more negative weekly tests.	.....	2	Treated twice*†—12 neg. tests.

*Treatments at two-week interval; †120 Gm. of powdered phenothiazine fed on each of four consecutive days before treatment. **Tests were at approximately weekly intervals. Tests conducted before Aug. 4, 1954, were scraping tests and those after Aug. 11, 1954, were preputial douche tests. Both tests were used from August 4 to August 11.

through which the procedure could be watched, and saline solution was used to wash a sample of mucus from the vaginal floor.

The feeding of phenothiazine[19] has been found to increase the number of organisms that can be found on the scraping tests or the preputial douche tests in some bulls. It is thought that the phenothiazine drives the trichomonads out of the crypts and wrinkles of the prepuce and penis, or it may cause them to multiply more rapidly. Bulls eat phenothiazine well when it is mixed in feed, without a marked drop in semen quality or other noticeable ill effects. Phenothiazine powder was fed daily (120 Gm.) on each of four consecutive days prior to testing selected bulls. The use of phenothiazine can not yet be evaluated, since it was not used (prior to testing) until most of the bulls were free of trichomoniasis.

DATES AND METHODS BY WHICH CASES WERE DIAGNOSED

Trichomoniasis was found in 18 bulls on the first test of the stud, Feb. 17-26, 1954, one scraping test being made on each bull. On the second scraping test (Feb. 27 to March 11), 1 more infected bull was found; and on the third test (March 12 to April 1), 2 more were found. Each bull in the stud was tested at least once each month by the scraping method until August, at which time the use of the preputial douche test was substituted. With the preputial douche test, 1 bull was found to be infected on September 27 and another on October 29, both of which had been negative on monthly scraping tests. The latter bull had also been negative on preputial douche tests during each of the two previous months. On November 12, a bull that had been brought to the stud the day before and isolated was found to be infected by the preputial douche test. Not until April 12, 1955, was another bull found to be infected. This bull had been negative on monthly scraping tests from February to August, 1954, and negative on monthly preputial douche tests from September, 1954, to March, 1955. He had not served any cows during this period, and strict sanitation had been employed when semen was collected.[4]

Thus, from Feb. 17, 1954, to April 12, 1955,[4] 24 of the 65 bulls in the stud were found to have trichomoniasis, and another infected animal was found in the 17 bulls added to the stud during this period. Of these 25 bulls, 18 were treated and 7 were sold as soon as they were found to be infected (tables 1, 2, 3).

METHOD OF TREATMENT

The treatment used was the massaging of the penis with bovoflavin ointment,®† and the injection of a solution of trypaflavin®† into the urethra.[18] The bull was tied securely and his attention was diverted by having an assistant hold his nose ring. A side line was sometimes used, or one hindleg was tied back to prevent kicking. The bull was then given a light epidural anesthetic (6 to 9 ml. of 2% procaine) and the pudendal nerve was blocked.[20] The preputial hair was trimmed, the penis withdrawn, and the prepuce and penis were washed with soap and water. Surgical gloves were worn while the penis and prepuce were massaged for 20 minutes with bovoflavin ointment. Then 30 ml. of a 0.1 per cent solution of trypaflavin was infused into the urethra and kept there for five minutes by holding the end of the penis.

When it became evident that most infected bulls required more than one treatment, two treatments were routinely given at an interval of two weeks.

In the latter part of this period, 120 Gm. of powdered phenothiazine was fed on each of four consecutive days prior to treatment. It was used on bulls 2, 3, 9, and 12, apparently with success. Bull 9 had previ-

†These products are manufactured by Farbwerke Hoechstag, Hoechst, Germany (formerly Meister Lucias and Bruning, Frankfurt.)

TABLE 2—Bulls that Were Being Treated Successfully but Died or Were Sold Due to Poor Semen Quality

Bull (No.)	Date diagnosed	No. of treatments	Date of, and reason for, disposal	Status when disposed of	History of treatments and tests.†
13	2/19/54	3	Died 11/9/54	17 neg. tests	Treated—13 neg. tests, Aug. 9, pos. on virgin heifer test; treated twice*—17 neg. tests.
14	2/18/54	3	Sold 9/7/54 Poor semen quality	14 neg. tests	Treated—3 neg. tests, pos.; treated twice*—14 neg. tests.
15	2/27/54	4	Sold 8/13/54 Poor semen quality	8 neg. tests	Treated—pos.; treated—2 neg. tests, pos.; treated twice*—8 neg. tests.

*Treatments at two-week intervals. †Tests were at approximately weekly intervals. Tests conducted before Aug. 4, 1954, were scraping tests and those after Aug. 11, 1954, were preputial douche tests. Both tests were used from August 4 to August 11.

ously been given six treatments and had remained infected.

SUMMARY OF TREATMENT RESULTS

A bull was considered to be no longer infected when he had passed six preputial douche or scraping tests at weekly intervals and two virgin heifer tests, or 20 weekly preputial or scraping tests if he would not serve heifers. Each bull that would not serve heifers was fed phenothiazine in doses of 120 Gm. daily for 4 days prior to a test late in his series of 20 tests.

We believe that 11 of 18 bulls treated are no longer infected. These 11 were treated a total of 36 times, an average of 3.27 times each. The average time from diagnosis until the bulls were considered to be no longer infected was approximately 9.3 months. The bulls have had an average of 46 negative tests at approximately weekly intervals to Sept. 1, 1955. Bull 12 was treated twice, with a two-week interval between treatments, and was found negative on 12 weekly preputial douche tests.

Bull 13 (table 2) had been given a total of three treatments and had been negative on 17 weekly tests when he died of an unrelated condition. Most of the other 5 bulls (14, 15, 16, 17, and 18) probably would eventually have passed the requirements had their value and semen quality warranted further treatment and testing. Bull 14 had been given three treatments and had been negative on 14 tests, and bull 15 had been treated four times and had been negative on 8 tests, when each was sold due to poor semen quality. Of the other three bulls (table 3), animals 16 and 18 had been treated once, and bull 17 three times. They had later been tested and found negative on 18, 11, and five weekly tests, respectively; but, on subsequent weekly tests, they were found positive and were sold, since their value did not warrant further treatment.

TABLE 3—Bulls Treated, then Sold when Found to Be Positive Since Their Value Did Not Warrant Further Treatment

Bull (No.)	Date diagnosed	No. of treatments	History of treatments and tests†
16	2/23/54	1	Treated — 12 neg. scraping tests, 2 neg. virgin heifer tests, 6 neg. douche tests; Oct. 7, pos. on douche test (6 neg. liner culture tests during Sept.); sold.
17	2/24/54	3	Treated — 3 neg. tests, pos.; treated twice*—5 neg. tests; Aug. 9, pos. on douche test (shortly after it was put into use); sold.
18	3/12/54	1	Treated — 11 neg. tests; July 28, pos. on virgin heifer test; sold.

*Treatments at two-week intervals. †Tests were at approximately weekly intervals. Tests conducted before Aug. 4, 1954, were scraping tests and those after Aug. 11, 1954, were preputial douche tests. Both tests were used from August 4 to August 11.

HEALTH PROGRAM

Since trichomoniasis was discovered at the bull stud, the following health program has been developed. Using the preputial douche method, every bull is tested monthly for trichomoniasis; each bull that has ever been infected (treated and presumably recovered) is tested weekly. A tuberculin test of all bulls in the stud is conducted annually and a brucellosis test every six months.

Before purchase, bulls are given a preliminary physical examination, if possible, in addition to brucellosis, leptospirosis, and trichomoniasis tests, and their semen is examined. The bulls are then isolated for 30 days, during which time each is tested six times for trichomoniasis by the preputial douche method and semen is collected and cultured especially to detect vibriosis or brucellosis; they are observed closely for signs of any disease and each is given a complete physical examination. Brucellosis and leptospirosis tests are again conducted at the end of this period.

Strict sanitation is employed when semen is collected, a sterile artificial vagina being used for each bull.[4] The rubber gloves worn by the technicians while collecting semen are disinfected and dried after semen collection from each bull. Most of the "jump cows" have been replaced by steers, and when cows are used for the few bulls that will not mount steers, great care is taken to prevent the bull from serving the cow, since she could be a source of infection. The "posteriors" of the "jump animals" are carefully washed after each collection of semen.

SUMMARY

1) During a 14-month period, trichomoniasis infection was found in 24 of 65 bulls in an artificial insemination stud, and in 1 of 17 bulls purchased.

2) Of the diagnostic methods used, the virgin heifer test, preputial douche test, and culture test appear to be most reliable. The scraping test, liner culture test, and the feeding of phenothiazine before testing were also used.

3) The method of treatment consisted of: (*a*) massaging the penis for 20 minutes with bovoflavin ointment after which 30 ml. of a 0.1 per cent solution of trypaflavin was kept in the urethra for five minutes; (*b*) a series of two treatments at two-week intervals, in most cases; and (*c*) feeding phenothiazine on four consecutive days prior to treatment in four cases (apparently with good results).

4) Eleven of the 18 bulls treated are considered to be no longer infected, being negative on an average of 46 weekly tests. Another is probably no longer infected, and the remaining 6 have been disposed of.

5) The average number of treatments per bull was 3.27 and the average time from diagnosis until recovery was 9.3 months.

6) The health program devised consists of: (*a*) routine test of all bulls in the stud for trichomoniasis (healthy bulls—monthly, those once diseased—weekly), for brucellosis (semiannually), and for tuberculosis (annually); (*b*) isolation, testing, and physical examination of new bulls; and (*c*) strict sanitation when semen is collected.

References

[1]Garlick, George G.: Transmission of Bovine Venereal Trichomoniasis Through Artificial Insemination. Vet. Med., *34*, (1939): 43-44.

[2]Bartlett, D. E., Tetter, K. G., and Underwood, P. C.: Artificial Insemination as a Means of Transmission of Bovine Venereal Trichomoniasis. J.A.V.M.A., *111*, (1947): 114-115.

[3]Vandeplassche, M., Paredis, F., and Doorme, H.: L'insemination Artificielle et La Trichomoniase chez Les Bovins. Zootech. Vet. — La Fecond. Artific., July, 1948.

[4]Joyner, L. P., and Millar, P. G.: The Transmission of *Trichomonas Foetus* During the Collection of Semen from Infected Bulls. Vet. Rec., *64*, (1952): 1-4.

[5]Bartlett, D. E., Moist, K., and Spurrell, F. A.: The *Trichomonas Foetus*-Infected Bull in Artificial Insemination. J.A.V.M.A., *122*, (1953): 366-370.

[6]Fitzgerald, P. R., Hammond, D. M., and Miner, M. L.: The Survival and Transmission of *Trichomonas Foetus* in Diluted Bovine Semen. Am. J. Vet. Res., *15*, (1954): 36-40.

[7]Hammond, D. M., and Bartlett, D. E.: Establishment of Infection with *Trichomonas Foetus* in Heifers. Am. J. Vet. Res., *4*, (1943): 61-65.

[8]Bartlett, D. E., Hasson, E. V., and Tetter, K. G.: Occurrence of *Trichomonas Foetus* in Preputial Samples from Infected Bulls. J.A.V.M.A., *110*, (1947): 114-120.

[9]Bartlett, D. E.: Procedure for Diagnosing Venereal Trichomoniasis and Handling Affected Herds. J.A.V.M.A., *114*, (1949): 293-305.

[10]Fitzgerald, P. R., Hammond, D. M., Miner, M. L., and Binns, W.: Relative Efficacy of Various Methods of Obtaining Preputial Samples for Diagnosis of Trichomoniasis in Bulls. Am. J. Vet. Res., *13*, (1952): 452-457.

[11]Fitzgerald, P. R., Hammond, D. M., and Shupe, L. J.: The Role of Culture in Immediate and Delayed Examinations of Preputial Samples for *Trichomonas Foetus*. Vet. Med., *49*, (1954): 409.

[12]Schneider, M.: A New Thermostable Medium for the Prolonged Bacteria-Free Cultivation of *Trichomonas Foetus*. J. Parasitol., *28*, (1942): 428-429.

[13]Plastridge, W. M.: Cultivation of a Bacteria-Free Strain of Trichomonas. J. Bact., *45*, (1943): 196-197.

[14]Groves, H. F.: The Effect of Antibiotics on the Viability of *Trichomonas Foetus* (Riedmuller, 1928), *in Vitro*. Thesis for M.S. degree, Ohio State University, 1953.

[15]Morgan, B. B.: Bovine Trichomoniasis. Burgess Publishing Co., Minneapolis, Minn. (1944): 41.

[16]Hammond, D. M., Fitzgerald, P. R., Binns, W., and Miner, M. L.: The Efficacy of Bovoflavin Salve in the Experimental Treatment of Trichomoniasis in Bulls. Cornell Vet., *43*, (1953): 121-127.

[17]Hammond, D. M., and Bartlett, D. E.: Pattern of Fluctuations in Numbers of *Trichomonas Foetus* Occurring in the Bovine Vagina During Initial Infections. I. Correlation with Time for Exposure and with Subsequent Estrual Cycles. Am. J. Vet. Res., *6*, (1945): 84-90.

[18]Bartlett, D. E., and Hammond, D. M.: Pattern of Fluctuations in Number of *Trichomonas Foetus* Occurring in the Bovine Vagina During Initial Infections. II. Application in Diagnosis. Am. J. Vet. Res., *6*, (1945): 91-95.

[19]Krill, W. R.: Bovine Trichomoniasis. Vet. Med., *39*, (1944): 345-347.

[20]Larson, L. L.: The Internal Pudendal (Pudic) Nerve Block for Anesthesia of the Penis and Relaxation of the Retractor Penis Muscle. J.A.V.M.A., *123*, (1953): 18-23.

Butter vs. Margarine Consumption

For the first time in six years, the per capita consumption of margarine decreased during the year (1955) from 8.4 to 8.3 lb. per capita, while butter increased slightly —from 9.0 to 9.3 lb. per capita. Butter consumption was increased partly by free school lunches and domestic relief programs.—*Trends, Central Nat. Bank, Chicago, Oct. 13, 1955.*

The supplementary air sacs in the bones of birds supply extra oxygen for the tremendous effort of flying.—*Sci. News Letter, Aug. 6, 1955.*

Brucellosis in Veterinarians

HAROLD J. HARRIS, M.D.

New York, New York

IT HAS been said that brucellosis is relatively uncommon in veterinarians, in spite of their degree of exposure. Huddleson stated in 1943 that a considerable percentage have agglutinins in their blood and give a positive intradermal test, while few give a history of having had a clinical course of the disease.

The most concerted attempt in recent years to determine the incidence of Brucella infection in veterinarians was reported by Damon, Scruggs, and Parker[1] in 1950. They performed blood-agglutination tests on 61 veterinarians who attended the annual meeting of the Indiana Veterinary Medical Association in 1947; of these, 33 (56%) showed agglutinins. At the 1948 meeting, of 73 tested, 34 (46.5%) showed agglutinins. In 1949, of 39 tested, 1 (2.5%) showed agglutinins.

At the meetings of the American Veterinary Medical Association in the same years, the following was found: in 1947, of 252 tested, 43 (17.3%) showed agglutinins; in 1948, of 174 tested, 29 (16.6%) showed agglutinins; in 1949, of 203 tested, 52 (25.6%) showed agglutinins.

No report was made as to the clinical status of the individuals showing agglutinins. Reactors were designated as those showing any degree of agglutination in titers of 1:80 or higher.

Spink *et al.*[2] have said that only titers of 1:320 or higher are significant, that titers below 1:100 may be nonspecific or may reflect an exposure to the disease sometime in the past which has nothing to do with the present illness. It is true that the presence of agglutinins does not necessarily indicate active brucellosis. Agglutinins may remain for varying periods after recovery from a symptomless infection. What titer should be considered significant depends, in my opinion, upon the sensitivity of the antigen used, the results of the other laboratory procedures, and the clinical findings.

The chronic illness can not be diagnosed by the same laboratory criteria that are applicable to the acute illness, in the majority of cases. Except during acute exacerbations of the chronic disease, agglutinins are likely to be absent or present in low titer only, and blood cultures rarely are positive. Positive cultures occasionally are found in the absence of agglutinins, showing the fallacy of using the agglutination test as the sole diagnostic measure. When tissue removed during surgery or biopsy is cultured, Brucella occasionally is recovered from fallopian tubes, prostate glands, lymph nodes, and other sources. These patients may not be currently ill but must be looked upon as infected and, therefore, as potentially ill.

These observations lead to two questions: What constitutes a clinical course of brucellosis? Are case-finding methods adequate?

WHAT IS BRUCELLOSIS?

The acute illness is so well understood that no discussion is necessary. But more than the usual concept of the chronic disease is essential. Perhaps it can best be presented by considering the following typical case:

Typical Case of Brucellosis in Man.—A 40-year-old veterinarian complained of fatigue, weight loss, arthralgia, myalgia, headache, dermatitis of the forearms, mild depression, and lack of sexual drive, some symptoms constant and some intermittent, over a period of two years. Complete physical examination and the usual laboratory studies had revealed only a slight degree of anemia. His temperature rarely had been over 99.6 F., orally, and was usually normal. Hematinics and vitamins had no apparent effect. He had been told that in view of the absence of definite physical findings, his symptoms probably were psychogenic.

He had been practicing veterinary medicine for ten years, had experienced no serious illnesses or operations, but had been frequently exposed to infection in cattle, rarely in hogs, and possibly in horses. He had occasionally consumed raw milk from supposedly infection-free cows.

By the standard macroscopic tube-agglutination method, he was positive in a 1:20 dilution, and in a 1:40 dilution by the microscopic slide method employing a virulent fresh culture of *Brucella abortus* as the antigen. Blood complement-fixation reaction was positive in a titer of 1:64. Opsonocy-

Presented at the annual meeting of the New York State Veterinary Medical Society, Saranac Inn, N. Y., Sept. 15-17, 1954.

tophagic reaction showed a moderate degree of resistance to Brucella infection, with marked phagocytosis in 4 cells, moderate in 10 cells, slight in 8 cells, and none in 3 cells—a numerical index of 44. The Signorelli reaction, which depends upon the loss of bactericidal power of the patient's blood against living Brucella organisms in the presence of Brucella infection, was positive. A blood culture was negative. The blood count showed, in addition to a slight decrease in hemoglobin and red cells, a leukopenia with 4,600 white cells, and a relative lymphocytosis with 45 per cent of polymorphonuclear neutrophils, 6 per cent eosinophils, and 49 per cent lymphocytes.

The skin test was withheld pending results of the blood studies because any effective skin-testing antigen may stimulate production of agglutinins, opsonins, and complement, resulting in diagnostic confusion. (The Signorelli reaction is not influenced by skin-testing.) The skin test was then done, using 0.1 cc. of a 1:1,000 dilution made from a stock concentration of 2 billion heat-killed *Br. abortus* organisms per cubic centimeter. This dilution was employed to avoid a violent intradermal reaction such as often occurs in those who have had skin contact with living Brucella organisms. (If it results in a negative reaction between the fourth and eighth days, the test is repeated using 0.1 cc. of the stock concentration.)

The test resulted in a marked reaction with characteristic aggravation of previously existing symptoms for two or three days, then tapered off. He remarked, in pleased surprise, that he had begun to feel better in all respects as the skin-test reaction subsided.

Redetermination of the opsonocytophagic reaction two weeks following the skin test showed a decided increase in resistance, with a numerical index of 90. The patient was told that frequently desensitization and immunization follows skin-testing, fortuitously, and that perhaps no active treatment would be necessary.

In such an instance, are we dealing with active, low-grade Brucella infection, or with Brucella allergy persisting after infection has become quiescent?

In the majority of such cases, if there is recurrence of the symptom pattern, treatment with subtolerance doses of suitably diluted Brucella antigens results in recovery, temporary or lasting. (Reinfection is, of course, often difficult to distinguish from relapse.) That the symptoms are not entirely due to Brucella allergy, but rather to low-grade infection, is strongly suggested by the fact that the broad-spectrum antibiotics also bring about recovery in a large percentage of these cases through suppression of the organism. Erythromycin also has been shown to have a suppressive effect.

As a member of the Expert Panel on Brucellosis, World Health Organization, United Nations, it seems proper to point out that the views expressed are my own. They are shared by some members of the Panel and disputed by others.

CASE FINDING METHODS

It has been suggested that the usual methods are inadequate for the diagnosis of chronic brucellosis.

In my experience, employing the battery of tests mentioned, and frequently a therapeutic trial of *Br. abortus* vaccine, 24 of 27 veterinarians studied showed evidence of brucellosis of varying degrees of severity. Since all were referred because they were ill, it is not intended to imply that 90 per cent of veterinarians are suffering from clinical or subclinical brucellosis. Unquestionably, some recover spontaneously from severe, or from mild unrecognized, infections and then remain relatively immune. Natural immunity probably is present in relatively few, however.

STRAIN 19 INFECTIONS

Dr. A. K. Kuttler, of the U.S. Department of Agriculture, in a recent personal communication, stated: "To our knowledge, there are only four published cases on record of presumed strain 19 infections in man. Only one of these is accompanied with pathological data of sufficient merit to be acceptable. . . . It is reasonable to believe that many of these cases are likely due to virulent field infection that develops . . . about the same time some accident in handling the vaccine occurred. . ."

Dr. Kuttler's comment points up the real crux of the problem. There is no way, except by isolation of the organism and identification of the species and strain of Brucella involved, that strain 19 infection can be differentiated from naturally occurring strains. With the tendency of physicians to administer antibiotics before adequate cultural and other studies are carried out, it is usually impossible to determine what organism has been suppressed or eradicated. That was the situation in the case of probable strain 19 infection reported recently by Bardenwerper.[3]

Spink and Thompson's[4] report of 2 cases of brucellosis in veterinarians engaged in immunizing calves included 1 so well authenticated by cultural studies as to leave no doubt that strain 19 was responsi-

ble. Dr. James Steele, chief, Veterinary Public Health, U. S. Public Health Service, in a recent personal communication, stated that there is no record of the disease being transmitted from animals which have been immunized, either through the milk or the secretions.

COMMENT

Although the incidence of brucellosis in cattle, as indicated by blood-agglutination tests, has decreased from 14 per cent in 1935 to less than 5 per cent in 1952, the herd infection rate in the United States is still about 20 per cent, showing the distribution of the disease hazard to man.

It is apparent that there should be no let-up in the precautions that veterinarians should take to protect themselves. These should include care in the handling of all animals, vaccinated or unvaccinated, and avoidance of the use of raw milk under all circumstances.

Veterinarians should also warn farmers and dairymen that the vaccination program has not yet resulted in the eradication of brucellosis and that their use of raw milk still is unsafe.

Since strain 19 has been proved to be infectious for man through accidental inoculation, and since the disease produced is indistinguishable clinically from infection due to naturally occurring strains, it would seem wise to withhold judgment as to the possibility of transmission of the infection through the milk or secretions of vaccinated animals. The question may not be resolved until such time as a sufficient number of infections in man are adequately studied in patients whose infecting organism has not been suppressed by the ill-advised early administration of antibiotics.

References

[1]Damon, S. R.: Scruggs, J. H., and Parker, E. B.: Brucellosis as an Occupational Hazard. J.A.V.M.A., *117*, (1950): 39.

[2]Spink, W. W., McCullough, N. B., Hutchings, L. M., and Mingle, C. K.: Diagnostic Criteria for Human Brucellosis: Report No. 2 of the National Research Council. Committee on Public Health Aspects of Brucellosis. J.Am.M.A., *149*, (June 28, 1952): 805.

[3]Bardenwerper, H. W.: Human Sickness Caused by *Brucella Abortus* Strain 19. J.Am.M.A., *155*, (July 10, 1954): 970.

[4]Spink, W. W., and Thompson, H.: Human Brucellosis Caused by *Brucella Abortus*, Strain 19. J.Am.M.A., *153*, (Nov. 28, 1953): 1162.

Bovine Brucellosis Revaccination

A comparative study of the immunological values of early vaccination, of revaccination, and of late vaccination in bovine brucellosis, using strain 19 *Brucella abortus* vaccine is reported.

One group of calves was vaccinated at 10 months of age, a second group at 10 months and again before breeding when 18 months of age, and a third group was vaccinated once at 18 months of age. Unvaccinated controls were included in the test. All the animals were bred by natural service and when pregnant from four and one-half to seven months received a conjunctival exposure of 1,500,000 organisms of the virulent *Br. abortus* strain 2308.

All vaccinated animals showed less infection than unvaccinated controls, but the results were more favorable in the revaccinated and in the late vaccinated groups than in those vaccinated at the age of 10 months. The results for late vaccination confirmed what has been observed by the author in field vaccinations.—*Francisco Sieiro, Am. J. Vet. Res., (Jan., 1956):36-39.*

Reactions to Strain 19 Vaccine

In a report by 31 veterinarians, covering perhaps 173,000 calves vaccinated subcutaneously on the side of the neck with 5 cc. of liquid *Brucella abortus* strain 19 vaccine, 123 calves were reported to have shown clinical reactions. Temperatures as high as 106 F. occurred constantly within 24 hours, along with dullness and anorexia. Stiffness was shown by 75 of the 123 calves in one to five days. Local reactions were visible in 39 calves within five days, 14 being on one premise, with a generalized edema in 1 calf. Five calves died, 2 were paralyzed but recovered, and 4 had convulsions. *Clostridium chauvei* was isolated from the lesions of 1 calf.—*Canad. J. Comp. Med., July, 1955.*

Experimental Fowl Typhoid Therapy

Furazolidone was much superior to sulfonamides, dihydrostreptomycin, chloramphenicol, terramycin,® and aureomycin,® both in 1-day-old and 9-week-old chickens with fowl typhoid. It was bactericidal for *Salmonella gallinarum*, while the others were bacteriostatic. Penicillin was valueless.—*Vet. Bull., June, 1955.*

Surgery and Obstetrics
and Problems of Breeding

Hysterotomy to Obtain "Disease-Free" Baby Pigs

ALVIN B. HOERLEIN, D.V.M., Ph.D.; CHARLES H. ADAMS, M.S.;
ROBERT J. MEADE, M.S., Ph.D.

Lincoln, Nebraska

BABY PIGS deprived of colostrum may be successfully raised if they can be protected from natural environmental factors.[1-3] Except during the first month of gestation, the placental barrier is apparently adequate to protect the fetus against disease. The pigs in the uterus are, therefore, essentially free of infectious disease. If no disease factors are added at the time of birth, they may be raised without the protection of colostral antibodies provided they are completely isolated from other swine.

Baby pigs deprived of colostrum are devoid of antibodies. "Disease-free," colostrum-deprived baby pigs are, therefore, unique experimental animals for studies on immunology and the pathogenesis of "pure" infections.

The idea of eliminating certain disease problems from herds of swine by the use of "disease-free" pigs has been tested.[4] These pigs demonstrated increased productive capacity and feed efficiency since they were not inhibited by the diseases present in the herd. The results indicate that this method may have a place in swine production since it offers a practical means of circumventing a herd disease by breaking the chain of infection to the young animals.

The problem of obtaining baby pigs free of contamination from the sow and her environment has been successfully handled by several methods. Baby pigs have been caught in sterile bags during normal farrowing and removed without contamination to isolated quarters.[1,3] This method is most successful when a large number of sows are available since there may be difficulty in waiting until a particular sow is ready to farrow. This has required a constant vigil for three or four days in some instances.

Cesarotomy has the advantage of making possible a definite time when the pigs will be procured and also avoids contamination in the birth canal.[2,3] By using local anesthesia, the pigs procured are awake and lively when delivered from the uterus. However, this operation is time-consuming and expensive when the recovery period for the sow is considered.

In the hysterectomy[4] method, the uterus of the preparturient sow is removed with its contents of baby pigs and passed through an antiseptic bath into a disinfected chamber where the pigs are removed. The sow is prepared for the operation by carbon dioxide anesthesia. The somewhat complicated equipment is expensive and a number of people are necessary for its operation. After hysterectomy, the carcass of the sow may be salvaged immediately for meat. These carcasses have passed the Meat Inspection Division of the U.S.D.A. The method has been used extensively in one large herd and has been satisfactory for procuring disease-free pigs.

The purpose of this article is to describe an improved procedure (hysterotomy) developed by combining features of the other methods. The apparatus is relatively simple and practical. The operation can be done in a local packing house or locker plant so that the carcass of the sow could be immediately salvaged for meat.

EQUIPMENT

Pregnant sows or gilts at least 110 days after breeding are the source of the pigs. Baby pigs may be raised any time after the 110th day of gestation (perhaps earlier) but more mature pigs, close to 113 days, are easier to start on feed. No special preparation of the sow is necessary before the operation.

The apparatus used to protect the baby pigs from contamination consists of a metal frame with a window which supports a sterile canvas liner. The frame is made of pipe and welded iron rod. It is 67 inches high, 28 inches wide, and 13 inches deep (fig. 1). The oval plexiglass window is bolted to the underside of the oval ring in the frame with the edge projecting ap-

From The Department of Animal Pathology and Hygiene (Hoerlein); Department of Animal Husbandry (Adams and Meade), University of Nebraska, Lincoln.

Published with the approval of the director as paper No. 710, journal series, Nebraska Agricultural Experiment Station.

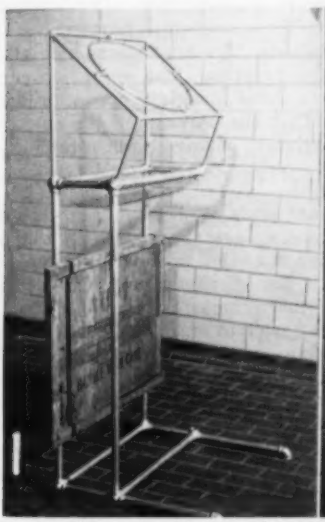
proximately 1 inch to receive and hold the large opening in the canvas liner. A wooden panel is placed on the lower part of the frame to prevent possible injury to the operator by the front feet of the sow.

The canvas liner is made to conform, in general, to the shape of the frame into which it is fastened by ties of cotton tape. Its large oval opening slips over the protruding edge of plexiglass window. Two openings in the front are provided with 6-inch sleeves to decrease the chances for contamination from air as the operator's arms are placed within. Pockets placed inside the liner hold a knife and small electrical (No. 60 "alligator" or "crocodile") clips to be used as temporary hemostats on the umbilical cords when severed. A cloth tube opening from the left side of the canvas liner is used to deliver the baby pigs into sterilized transport boxes.

The back of the liner has a flexible, slitlike opening (fig. 2), 13 inches long, which is held to the sow's belly after the incision has been made and through which the uterus is delivered into the canvas liner. The desired flexibility of the sides of this opening was obtained by hemming or sewing screen door springs containing No. 10 copper wire into the edges of the cloth. This opening remains closed until applied to the abdomen of the sow, when it can be opened from the inside to the shape and size desired. Tapes attached at the top and bottom of the opening are long enough to be tied around the sow, thus pulling the edges tight against her abdomen. A false floor of hardware cloth, constructed as a flattened tube, lies on the bottom inside the canvas liner to hold the pigs out of, and to prevent them from inhaling, fluids from the uterus.

Before use, the temporary umbilical clips, a knife, and 1 foot of heavy cord or tape are put in the pocket of the canvas liner and the false floor placed in position. The canvas liner is then folded, wrapped in paper, and sterilized in the autoclave.

Other necessary equipment includes: a 32-gallon galvanized iron can, into which 1½ to 3 lb. of crushed dry ice is placed to provide carbon dioxide for anesthesia; electric chain hoists to be attached to each hindleg of the sow by shackles, or a spreader to be placed between the hindlegs if one hoist is used; disinfected skinning knife for making the abdominal incision; and galvanized bushel baskets, cardboard boxes, or wooden boxes (22 in. by 11 in. by 7 in.), with a towel covering the open



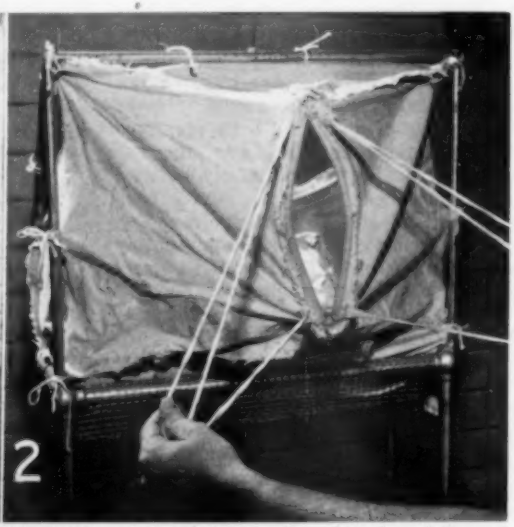


Fig. 1—Pipe and welded iron frame with plexiglass window bolted to the under edge of the oval ring, which supports the sterilized canvas liner.

Fig. 2—Canvas liner tied into place in the frame, showing the flexible slitlike opening which is held against the sides of the incision in the abdomen of the sow by the long cotton tapes fastened at the top and bottom of the opening.

top, as containers to receive and transport the pigs. The containers are disinfected the day before use by applying 10 per cent formalin to the inside and allowing it to evaporate through the towel. By raising the end of the towel, the delivery tube of the canvas liner is placed into the container to minimize contamination of the pigs as they are placed in it.

PROCURING THE PIGS

The operator's hands are thoroughly scrubbed with soap and water and disinfected with a quaternary ammonium compound before he sets up the apparatus. The inner surface of the plexiglass window is mopped with the disinfectant after which the sterile canvas liner is unwrapped and fastened into position inside the frame with the outside tape ties. The operator is careful not to contaminate his hands so that he is ready to handle the pregnant uterus inside the apparatus. The assistants then shackle one hindleg of the sow so that she may be raised from the floor by an electric chain hoist and lowered head first into the can containing the carbon dioxide for anesthesia. While the sow is being anesthetized, the second hoist or the spreader is applied, thus pulling the hindlegs apart for ease of operation. Her abdomen is then scrubbed with a towel soaked with quaternary ammonium solution. After a minute or so, anesthesia is evidenced by lack of struggling and limpness of the tail. The can with the dry ice is then removed and the abdominal wall is quickly incised with a disinfected knife, by an assistant, through the peritoneum from the pubis to slightly beyond the navel.

The apparatus is then moved to the sow and the opening of the canvas liner placed over the sides of the incision while the strings are being tied around the sow (fig. 3, 4). The operator, whose hands have been

Fig. 3—Apparatus in place as the uterus is being brought into the canvas liner. The galvanized iron can containing the dry ice is usually removed before the apparatus is fastened to the sow. The "sleeve" on the side of the apparatus is the tube through which the pigs are delivered into a sterile transport box.

Fig. 4—Front view of apparatus with plexiglass window through which the baby pigs can be seen as they are being removed from the uterus.

thoroughly scrubbed as mentioned above, quickly brings the uterus into the apparatus, taking care to find both ovarian ends so that no pigs will be missed. The wall of the uterus is quickly torn open with the fingers to release the baby pigs which are immediately freed from the covering fetal membranes. At this time, the sow should be bled (by sticking in the usual manner) since the anesthesia induced by carbon dioxide is of short duration. As soon as all the pigs are freed, the umbilical cord of each pig is clipped temporarily with a small "alligator" or "crocodile" electrical clip approximately 2 inches from the body, the umbilical cord is torn off by hand below the clip and the pig transferred through the delivery tube to the transport box.

When all the pigs have been placed in boxes, the body of the uterus is tied off with strong cord or tape and severed from the sow. The apparatus is then removed from the sow and her carcass is prepared for scalding and dehairing. The abdominal incision is closed by loosening a flap of skin around the incision and fastening the everted skin edges together with metal staples (bostich No. P4-8). The subcutaneous fat prevents leakage[4] but for safety the incision is reinforced and buried with a simple shoe-string suture. Hemorrhage into the abdominal cavity often occurs from ruptured ovarian arteries, but the blood is easily removed by washing. The carcass may be handled like that of any other slaughtered sow. Carbon dioxide is a normal metabolite and does not detract from the appearance or commercial value of the carcass.

It is important to operate quickly since the high concentration of carbon dioxide is a stimulus for the fetuses to breathe. If they have not been released from the uterus when so stimulated, they will inhale placental fluids and drown. This does not occur if the pigs are released within two minutes of the time that the anesthesia is complete, which can be accomplished by three men if their duties are properly organized.

Upon arrival in the isolation rooms, the transport containers are opened and each pig is given a vitamin K tablet (1 mg. menadione, Lilly), weighed, and numbered for identification. The umbilical cords are tied above the temporary clips with umbilical tape and the stumps disinfected with tincture of iodine before putting the pigs into cages. Both modified Horsfall-Bauer isolation cages[5] and open individual cages have been used successfully. The pigs can be raised on cow's milk modified by adding one whole egg per quart of pasteurized milk and iron salts.[1] It is important to keep the isolation rooms at a high temperature (90 to 100 F.) for the first few days, since baby pigs are highly sensitive to cold. The pigs soon learn to drink from a shallow pan and make satisfactory gains.

CONCLUSIONS

Baby pigs procured near full-term by hysterotomy and not contaminated by the sow or her environment may be raised in isolation without colostrum.

How this can be accomplished by a simple procedure utilizing an inexpensive apparatus is described.

References

[1]Young, G. A., Jr., and Underdahl, N. R.: A Diet and Technique for Starting Pigs Without Colostrum. Arch. Biochem. and Biophys., *32*, (1951): 449-450.

[2]Thompson, C. M., Whitehair, C. K., MacVicar, R. W., and Hillier, J. C.: Observations on Artificially Raising Healthy Swine. Oklahoma Agric. Exper. Sta. M. P. 27 (June, 1952): 74-77.

[3]Bauriedel, W. R., Hoerlein, A. B., Picken, J. C., Jr., and Underkofler, L. A.: Selection of Diet for Studies of Vitamin B_{12} Depletion Using Unsuckled Baby Pigs. Agric. and Food Chem., *2*, (1954): 468-472.

[4]Young, G. A., Jr., Underdahl, N. R., and Hinz, R. W.: Procurement of Baby Pigs by Hysterectomy. Am. J. Vet. Res., *16*, (1955): 123-131.

[5]Young, G. A., Jr., and Underdahl, N. R.: Isolation Units for Growing Baby Pigs Without Colostrum. Am. J. Vet. Res., *14*, (1953): 571-574.

Effect of Alfalfa on Gilt Ovulation

When 42 gilts were fed a complete ration, including 18 per cent of ground alfalfa (sun-cured), and another 42 fed the same ration with the alfalfa replaced by ground ear corn with an excess of vitamins A, B, and D added, there was no noticeable difference in the breeding performance; but the alfalfa group showed a significant increase in the number of ova liberated, the number of live pigs farrowed, and the number of pigs weaned. —*J. Anim. Sci., Aug., 1955.*

An Illinois sow farrowed 22 living pigs, 12 on Thursday and 10 the following Monday.—*Prairie Farmer, Nov. 5, 1955.*

Bovine Semen Production

One Holstein-Friesian bull was found to show sexual interest first when 25 weeks old and to ejaculate first when 38 weeks old. For the next three years, semen collected from him three times per week averaged 2.8 ml. per ejaculation, with a concentration of 1,089,000 sperm per milliliter the first year; 3.8 ml. with a concentration of 1,530,000 the second year; and 5.0 ml. with a concentration of 1,513,000 the third year. This was sufficient to breed a potential of 251,382 cows in three years.—*Nat. A. Artificial Breed. News, Sept.-Oct., 1955.*

Pregnancy and Cortisone

Administering corticotropin or cortisone to gravid laboratory animals has reportedly caused abortion, partly resorbed or macerated fetuses, neonatal death, or congenital anomalies. A woman, on a daily dose of 50 to 75 mg. of cortisone throughout pregnancy because of polyarthritis, showed no ill effects. However, her otherwise healthy baby had transitory episodes of hyperglycemic coma resembling those seen when cortisone therapy is abruptly withdrawn from a patient. When 10 pregnant white rats were given, daily, 3 mg. of cortisone intramuscularly, pregnancy and parturition were normal but the adrenal glands of the young were definitely smaller than in young from control animals.—*J.Am.M.A. Sept. 17, 1955.*

An Intravenous Needle Lock.—A device to maintain a needle in the vein, consisting of a collar that slips over the hub of the needle and a spring clip with prongs that hold but do not pierce the skin, is described in the *Journal of the American Medical Association* (May 21, 1955).

Pituitary Changes in Cryptorchism

Surgical induction of cryptorchism in rats resulted, 12 to 18 months later, in an extraordinary hypertrophy and hyperplasia in the pituitary gland. This is also seen in rats with diethylstilbestrol implants and can assume a nodular or even adenomatous character. Four of these rats developed mammary tumors, suggesting that the estrogen secreted by the ectopic testes may be a factor in the pathogenesis of pituitary changes.—*J.Am.M.A., Sept. 24, 1955.*

Postparturient, Extrauterine Canine Fetus

WILLIAM H. KUHLMAN, D.V.M., and
D. J. KOVAN, D.V.M.

Allen Park, Michigan

A female Beagle, 4 years old, was seen on Aug. 5, 1955. She had delivered 2 pups four weeks previously without difficulty but had shown a cannibalistic attitude by partially devouring 1 puppy. The other 1 was raised as an orphan. After acting completely normal for three weeks, she had, three days prior to the examination, become listless and refused all foods and liquids.

She had a temperature of 103 F. and was depressed and dyspneic. Her abdomen was pendulous and paracentesis produced a serosanguineous fluid containing a few hairs. A radiograph showed two fetal heads, one body, and particles of small bones in the abdomen.

A laparotomy was done under sodium pentothal anesthesia and about 2 quarts of fluid and the remnants of 1 fetus were removed from the peritoneal cavity. A 2-inch rupture was found in the left horn of the uterus 2 inches anterior to the uterine bifurcation. In the tip of the left horn, apparently undisturbed by parturition, was a mummified fetus. Due to extensive adhesions, the right horn and ovary were not isolated but the left horn and ovary were removed. The organs of the abdomen showed a brown discoloration from the fetal fluid. The abdomen was rinsed with saline solution, antibiotics were placed in the cavity, and the incision was closed with nylon sutures. During the entire operation, saline solution and dextrose were administered intravenously. For three days, until discharged, sulfonamides and combiotic were administered daily. The day following surgery the bitch ate two small meals and drank some fluids. The sutures were removed on the tenth postoperative day and she made a complete recovery.

Drs. Kuhlman and Kovan are small animal practitioners in Allen Park, Mich.

Whelping Temperature.—While the normal temperature of a dog is 101 to 102 F., the temperature usually drops to about 98 F. from one to four hours before whelping.—*All Pets Magazine, Oct., 1955.*

Clinical Data

A Preliminary Report on the Use of Meticorten in Bovine Ketosis

ROBERT G. MORRIS, D.V.M., and CHARLES E. HALL, D.V.M.

Seneca Falls, New York

KETOSIS in dairy cattle is a condition which occurs with varying degrees of severity. It is usually observed in well-nourished, high-producing cows and heifers and may occur directly after calving (parturient) or at any time during lactation (nonparturient).[1] Ketosis occurs primarily in mature animals (third calving or later), but first-calf heifers may be affected.

For years, glucose has been given intravenously as the treatment of this condition, and animals with mild or moderate infection may be expected to respond to this therapy. However, many cows with ketosis have shown an unsatisfactory response to glucose and more effective therapy has been sought.

Shaw *et al.*[2] established the effectiveness of the adrenocortical hormones with cortisone in the treatment of ketosis, and McAuliff, Phillips, and Steele[3] showed that the adrenocorticotrophic hormone (ACTH) is helpful.

Some preliminary observations have been made on the use of hydrocortisone. According to Shaw and co-workers,[4] hydrocortisone alcohol was found to be effective in treating ketosis in studies conducted in Maryland and nearby states.

Thus, in spite of the controversy pro and con concerning pituitary adrenal insufficiency, and the "stress mechanism" as a potentiator of ketosis, these and other studies have established the therapeutic value of the adrenocortical hormones in bovine ketosis, whether these agents act as replacement or by stimulation.

Early in 1955, results on the use of meticorten® (prednisone) first began to appear in the medical literature.[5-7] In man, it was shown to have three to five times the activity of cortisone or hydrocortisone. It was, therefore, given a trial in the veterinary field as a possible treatment for ketosis.

The method employed in this clinical study was: (1) All animals were carefully examined to determine the possible presence of diseases other than ketosis; (2) urine samples were tested for urinary ketone bodies, and the blood glucose was determined (table 1); and (3) where practical, blood samples were taken at 24, 48, and 72 hours, and seven days after treatment.

Our criteria in diagnosing true primary ketosis included: positive urine reactions, plus a drop in milk production, with partial or complete anorexia, paresis, nervous manifestations, a rapid weight loss and general lassitude, and the absence of signs of other complicating conditions. Lowered blood sugar levels were considered strong confirming evidence.

When a positive diagnosis was established, meticorten was given by deep intramuscular injection (100 to 400 mg.). The clinical and metabolic recovery of each individual was then determined by blood samples and physical examinations of the animals.

This study involved 40 animals (28 shown in table 1). Those with primary and secondary, or complicated, ketosis were included. Those diagnosed as having chronic ketosis had shown symptoms for a week or more, or had received other treatments over a period of time without response. One cow with secondary ketosis had been fresh for five months. She had exhibited complete anorexia for four days and was being treated for indigestion. When urine ketones appeared on the fifth day, she was treated with meticorten. Cows listed as having complicated cases of ketosis were positive for urinary ketones but showed evidence of some complicating condition such as metritis or mastitis. Most of the ketotic cows in our practice which were treated in the period from April 10 to June 1, 1955, are included in table 1, but more information on several typical cases which received various dosage levels appear in detail in the case reports.

Drs. Morris and Hall are large animal practitioners in Seneca Falls, N. Y.

Meticorten (prednisone, formerly metacortandracin) was supplied by the Vererinary Medicine Department, Schering Corp., Bloomfield, N. J.

CASE REPORTS

Case 1.—On April 4, 1955, a Holstein-Friesian, 5 years of age, which had been milking approximately 48 lb. daily dropped to 40 lb. and refused feed. When examined on April 5, she had an increased inappetence, a gaunt attitude, normal temperature, pulse, and respirations, and a very active rumen but the contractions were not complete. Her feces were dry, her urine showed a 4-plus reaction for ketone bodies, and a blood sample showed 16 mg./100 cc. of blood glucose. The diagnosis was primary ketosis.

Meticorten aqueous suspension, 400 mg., was injected intramuscularly. On April 6, her appetite had improved considerably and the blood glucose level was 57 mg./100 cc. Since then her appetite has been excellent, and her milk production rose in seven days to 55 lb. per day. The condition has not recurred.

Case 2.—On April 4, a Holstein-Friesian, 5 years of age, had shown a gradual diminishing of appetite for one week and in four days had dropped from 50 to 20 lb. of milk per day. Her temperature, pulse, respirations, and rumen motility were normal but she was eating hay and straw only and her feces were scanty. She showed a 3-plus reaction for urinary ketone bodies and 11 mg./100 cc. of blood glucose. A diagnosis of ketosis was made.

She was given 200 mg. of meticorten intramuscularly. Forty hours later, her appetite was improving and she had 52 mg./100 cc. of blood glucose. On April 13, her appetite was excellent, milk production had reached 45 lb. per day, her blood glucose reading was 42 mg./100 cc., and other clinical evidences of response were evident.

Case 3.—On April 2, a Holstein-Friesian, 6 years of age, freshened normally. She had been treated for metritis which could still be detected by rectal palpation and by vaginal examination.

She had complete anorexia, a 4-plus reaction for urinary ketone bodies, a normal temperature, pulse, and respirations, and her blood glucose was 35 mg./100 cc. The diagnosis was ketosis complicated by metritis. Previous treatment had consisted of penicillin, streptomycin, stilbestrol by in-

TABLE I—Response of Animals (28 of 40)* Treated with Meticorten

Breed and case	Age (yr.)	Diagnosis	Urine ketone reaction	Blood sugar (mg./100 cc.) 0 (hr.)	24 (hr.)	48 (hr.)	7 (days)	Meticorten (mg.)	Re-treatment meticorten (mg.)	Remarks
Guernsey	8	Pr. K.	4+	—	25	—	34	400**	None	Recovered
Holstein-Friesian (case 1)	5	Pr. K.	4+	16	57	—	—	400	None	Recovered
Holstein-Friesian (case 2)	5	Ch. K.	3+	11	—	52	42	200	None	Recovered
Holstein-Friesian	10	Pr. K.	4+	36	42	—	38	250	None	Recovered
Holstein-Friesian	6	Sec. K.	2+	—	—	—	—	200	None	Recovered
Holstein-Friesian	5	Co. K.	4+	24	26	—	50	250	200-15th day	Recovered
Holstein-Friesian	6	Pr. K.	4+	—	—	—	—	200**	100- 2nd day	Recovered
Holstein-Friesian	5	Pr. K.	4+	25	36	—	57	300	None	Recovered
Brown Swiss	8	Ch. K.	4+	19	—	55	—	250	100- 4th day	Recovered
Guernsey	6	Pr. K.	4+	18	28	—	—	200**	None	Recovered
Holstein-Friesian	3	Ch. K.	3+	45	—	54	—	150	None	Recovered
Holstein-Friesian	4	Pr. K.	4+	44	45	—	—	300	None	Recovered
Ayrshire	8	Ch. K.	4+	14	—	62	—	400	None	Recovered
Holstein-Friesian (case 3)	6	Co. K.	4+	35	—	55	—	250	None	Recovered
Holstein-Friesian	6	Pr. K.	3+	42	—	78	—	200	None	Recovered
Guernsey (case 4)	6	Pr. K.	4+	15	—	—	—	200	None	Recovered
Holstein-Friesian	6	Ch. K.	4+	9	—	47	—	250	None	Recovered
Holstein-Friesian	4	Pr. K.	4+	53	—	56	—	100	None	Slow recovery
Holstein-Friesian	4	Pr. K.	3+	29	36	—	—	200	None	Recovered
Holstein-Friesian	2	Ch. K.	4+	25	—	44	—	250	None	Recovered
Holstein-Friesian	6	Pr. K.	3+	54	—	58	—	250	None	Recovered
Holstein-Friesian	6	Pr. K.	4+	15	38	—	—	200	None	Recovered
Guernsey	8	Pr. K.	4+	26	—	37	—	200	None	Recovered
Holstein-Friesian	10	Pr. K.	4+	31	—	49	—	200	None	Recovered
Holstein-Friesian	6	Pr. K.	3+	36	—	58	—	100	None	Slow recovery
Holstein-Friesian	4	Pr. K.	4+	39	—	88	—	200	100- 3rd day	Recovered
Holstein-Friesian	8	Pr. K.	4+	18	—	54	—	200	None	Recovered
Holstein-Friesian	6	Pr. K.	4+	29	—	58	—	250	None	Recovered

*Including all cases with blood sugar comparisons. **Plus 500 cc. of 50 per cent dextrose.
Co.K = complicated ketosis; Sec.K = secondary ketosis; Ch.K = chronic ketosis; Pr.K. = primary ketosis.

tramuscular injection, and gammamycin (Pitman-Moore) instilled in the uterus.

Meticorten (250 mg.) was injected intramuscularly. The cow was eating in 12 hours and on full feed in 24 hours. A blood sample drawn at 24 hours showed the blood glucose to be 35 mg./100 cc. On April 25, she was vastly improved and her production was normal.

Case 4.—On April 15, a Guernsey, 6 years of age, which had freshened normally five weeks previously, was partially anoretic. She had shown a steady drop of production for about two weeks. Her temperature, pulse, and respirations were normal, and her rumen motility was constant. She had a 4-plus reaction for urinary ketone bodies. Her blood glucose was 15 mg./100 cc. (the post-treatment blood sample clotted). A diagnosis of ketosis was made.

She received 200 mg. of meticorten intramuscularly. In 48 hours, her milk production had increased by 60 per cent and on April 21, her appetite and production were normal.

Some idea of the relative value of meticorten in the treatment of bovine ketosis can be obtained by comparing the above results with the following summarization of 40 cases seen prior to its use. Our routine therapy had consisted of dextrose (10 to 50%), tonics (ferrocobalt or iron, arsenic, and strychnine), chloral hydrate where indicated, and occasionally sodium propionate. In more severe cases, ACTH or ACTH in dextrose, or cortisone were used on the initial visits. These products were used routinely on repeat calls, but often, for economic reasons, at levels below the recommended therapeutic doses.

Of these 40 animals (seen from Jan. 7 to April 1, 1955), 20 recovered with the initial treatment, 14 responded to a second treatment, 4 recovered with the third treatment, and the other 2 required at least four visits before recovery was effected. These 40 animals included all types of ketosis, as did the other group, and all recovered completely, but the longest course of treatment was five weeks.

In our opinion, the results obtained with meticorten have been most gratifying. Of the 40 animals with ketosis in which it has been used, 36 (88%) responded to only one injection, 2 required a second injection before the symptoms disappeared, while the other 2 seemed to be responding satisfactorily but the owners insisted on a second injection, one at 24 and the other at 72 hours. The dose varied from 100 to 400 mg., with 200 mg. being most commonly used. Meticorten markedly reduced the usual duration of ketosis as well as the number of repeat visits.

Blood sugar levels of cattle receiving meticorten were observed to rise rapidly to normal levels or higher and were maintained for 48 hours or longer. The animals were back on feed in 24 hours or less, and milk production rose to normal levels or higher in five to seven days. The new drug also appeared to produce in the treated animals the same feeling of well-being that was generally reported in human patients receiving this product.

SUMMARY

Meticorten, a new corticosteroid recently introduced in the human medical field, was used in 40 cattle suffering from ketosis.

The dose employed ranged from 100 to 400 mg., with 200 mg. being most frequently used.

Of the 40 animals treated, 36 responded to a single injection, 2 required an additional injection, and 2 were responding, but were re-treated at the owners' insistence.

After treatment, blood glucose values rose rapidly to normal and the animals went back on feed. Milk production, which had been suppressed, returned to normal levels or above in five to seven days.

References

[1]Udall, D. H.: The Practice of Veterinary Medicine. 5th ed. Published by the author, Ithaca, N.Y. (1947): 364-373.

[2]Shaw, J. C., Hatziolos, B. C., and Chung, A. C.: Studies on Ketosis in Dairy Cattle. XV. Response to Treatment with Cortisone and ACTH. Science, *114*, (1951): 575-576.

[3]McAuliff, J. L., Phillips, W. V., and Steele, J. R.: Treatment of Ketosis in Dairy Cows: A Clinical Report. Vet. Med., *44*, (Feb., 1954): 69-74.

[4]Shaw, J. C., Hatziolos, B. C., and Leffel, E. C.: Studies on Ketosis in Dairy Cattle. XVI. The Pituitary-Adrenal Cortical Syndrome. North Am. Vet., *34*, (1953): 251-156.

[5]Bunim, J. J., Pechet, M. M., and Bollet, A. J.: Studies on Metacortandralone and Metacortandracin in Rheumatoid Arthritis. J.Am.M.A., *157*, (Jan. 22, 1955): 311-318.

[6]Bolland, E. W.: Recent Advances in Rheumatic Diseases. California Med., *82*, (1955): 69.

[7]Gray, J. W., and Gluck, E. J.: Preliminary Clinical Trials with Prednisone (Meticorten) in Rheumatic Diseases. J.Am.M.A., *158*, (May 21, 1955): 166-170.

Antibiotic Resistance of Organisms Associated with Bovine Mastitis

R. A. HUEBNER, V.M.D., and JANE O. SCHEETZ, B.S.

Philadelphia, Pennsylvania

WITH THE WIDE, and often promiscuous, use of antibiotics for the treatment of bovine mastitis in the past decade, many questions have been raised concerning the development of bacterial antibiotic resistance as a result of these practices. However, from the literature it would appear that the induction of resistance in previously susceptible strains of organisms is more imaginary than real; the change observed has been, rather, the emergence of inherently resistant strains.

Ford and Wilson,[1] in their studies of *Streptococcus agalactiae* isolated before and after penicillin therapy, established that cultures of these organisms revealed no tendency to develop resistance to penicillin during the course of treatment.

Several studies have indicated that staphylococci from human sources have not increased their resistance to penicillin after antibiotic therapy of the patient.[2, 3] Andreu *et al.*[4] have reported that the increase in penicillin-resistant strains must be attributed to the relative increase in the number of naturally resistant strains as the naturally sensitive strains are diminished by penicillin therapy. Oswald *et al.*,[5] in a study of 910 cultures from both normal and recently hospitalized human beings, determined that, in their opinion, there had been little or no increase in penicillin-resistant forms of staphylococci among the general population in the last ten years; cross infections and other mechanisms were blamed for the isolation of greater numbers of resistant forms.

The extensive work of Schalm and Woods[6] indicated that staphylococci isolated from bovine milk may show considerable resistance to penicillin and the percentage of resistant strains may vary among herds. In one herd 74.5 per cent of the strains isolated withstood 1.0 unit or more of penicillin per milliliter of milk; in a second herd it was 5.5 per cent. However, all of the 920 strains examined were obtained from shedder cows, with clinical symptoms of mastitis appearing in only 18.7 per cent of a total of 341 of their lactations.

Edwards[7] reported, in a comparative antibiotic study of 37 lactating cows, that failure to eliminate infection from the udder was not due to the development of increased resistance of the staphylococcic strain to the antibiotic employed but was related to the duration of infection. The studies of Alford *et al.*[8] supported this opinion and showed that the development of antibiotic resistance was of minor significance.

This study involves 31 cultures of *Staphylococcus aureus* and 4 cultures of *Pseudomonas aeruginosa* obtained from refractory cases of bovine mastitis at the University of Pennsylvania and the University of Vermont; all cultures were classed as pathogens. Each cow had essentially the same clinical history: repeated mastitic attacks over a period of several months or years in spite of repeated treatments with various of the antibiotics, singly and in combination, and with different sulfonamide mixtures. These cases were of the type familiar to the practicing veterinarian; the cows ultimately go to the butcher leaving an economically injured farmer and an unhappy practitioner. Certainly, on a clinical basis, these strains of organisms were considered to be resistant to all of the common antibiotics and sulfonamides.

The cultures were examined in the laboratory by the standard tube-serial dilution method for the antibiotics indicated and the results are shown in table 1.

Table 2 summarizes the detailed report outlined in table 1.

DISCUSSION

Although this report describes only 31 cultures of *Staph. aureus* and 4 cultures of *Ps. aeruginosa*, its primary significance lies in the case histories of the cows from which these organisms were isolated. Concerning penicillin resistance of staphylococci, these figures are in relatively close agreement with those of Oswald *et al.*[5] whose incidence of highest occurrence was 26 per cent.

Despite the fact that these animals had received local treatment with penicillin and bacitracin in addition to other antibiotics,

From the Department of Veterinary Service, Wyeth Laboratories, Philadelphia, Pa.

The cultures in this study were provided by the cooperation of Dr. M. J. Deubler, assistant professor of veterinary pathology, University of Pennsylvania School of Veterinary Medicine, Philadelphia; and Dr. W. D. Bolton, professor and head, Department of Animal Pathology, University of Vermont, Burlington. Gratitude is extended to the staff of the Antibiotic Division, Wyeth Laboratories, West Chester, Pa., for their technical assistance in this project.

TABLE 1—Concentrations of Antibiotic per Milliliter Required for Inhibition of Organism

Culture	Organism	Penicillin (units)	Bacitracin (units)	Streptomycin (μg.)	Erythromycin (μg.)	Polymyxin B (units)
417A	Staphylococcus aureus	>8.0	>8.0	>8.0	>8.0	>8.0
427A	Staphylococcus aureus	0.1	0.2	>8.0	0.2	>8.0
435C	Staphylococcus aureus	0.1	0.6	>8.0	0.4	>8.0
452C	Staphylococcus aureus	0.1	0.6	>8.0	0.4	>8.0
455D	Staphylococcus aureus	8.0	0.4	>8.0	0.4	>8.0
573C	Staphylococcus aureus	8.0	0.4	>8.0	0.2	>8.0
MC4	Staphylococcus aureus	0.1	4.0	>8.0	0.2	>8.0
MC5	Staphylococcus aureus	0.1	4.0	>8.0	0.2	>8.0
MC9	Staphylococcus aureus	0.1	6.0	>8.0	0.4	>8.0
MC14	Staphylococcus aureus	0.1	4.0	>8.0	0.2	>8.0
MC25	Staphylococcus aureus	>8.0	8.0	8.0	0.6	>8.0
MC53	Staphylococcus aureus	0.8	4.0	>8.0	—	—
54	Staphylococcus aureus	>8.0	>8.0	>8.0	—	—
55	Staphylococcus aureus	>8.0	4.0	>8.0	>8.0	>8.0
56	Staphylococcus aureus	>8.0	>8.0	>8.0	—	—
58	Staphylococcus aureus	0.06	2.0	>8.0	2.0	>8.0
59	Staphylococcus aureus	0.2	4.0	>8.0	—	—
60	Staphylococcus aureus	0.2	>8.0	>8.0	—	—
61	Staphylococcus aureus	2.0	4.0	4.0	—	—
62	Staphylococcus aureus	0.08	0.6	>8.0	0.6	>8.0
63	Staphylococcus aureus	0.06	2.0	>8.0	0.8	>8.0
64	Staphylococcus aureus	0.1	2.0	>8.0	—	—
MC66	Staphylococcus aureus	0.04	8.0	>8.0	0.6	>8.0
MC67	Staphylococcus aureus	0.08	0.4	>8.0	0.6	>8.0
68	Staphylococcus aureus	0.2	>8.0	>8.0	0.8	>8.0
MC69	Staphylococcus aureus	0.02	2.0	>8.0	2.0	>8.0
70	Staphylococcus aureus	0.02	2.0	>8.0	0.8	>8.0
71	Staphylococcus aureus	0.04	8.0	>8.0	—	—
UVT1	Staphylococcus aureus	0.1	0.3	>8.0	0.6	>8.0
UVT2	Staphylococcus aureus	0.2	0.6	>8.0	0.8	>8.0
UVT3	Staphylococcus aureus	0.08	0.6	>8.0	0.4	>8.0
MC1	Pseudomonas aeruginosa	>8.0	>8.0	>8.0	—	>8.0
51	Pseudomonas aeruginosa	>8.0	>8.0	>8.0	—	—
65	Pseudomonas aeruginosa	>8.0	>8.0	>8.0	—	—
SC34	Pseudomonas aeruginosa	>8.0	>8.0	>8.0	—	—

>8 = organism not affected at this maximum concentration of antibiotic.

71 per cent of the strains of staphylococci were sensitive to penicillin and 71 per cent were sensitive to bacitracin. However, resistance or sensitivity of the organisms to these antistaphylococcic drugs is not in direct relationship in each strain (table 1), indicating that a specific mechanism operates in each capacity.

TABLE 2—Antibiotic Susceptibility of Staphylococcus Aureus

	No. of strains	Percentage of total examined
Penicillin[9]		
Very sensitive (up to 0.1 unit/ml.)	18	58.1 } 71.0%
Sensitive (0.1 to 0.5 unit/ml.)	4	12.9 } sensitive
Moderately Resistant (0.5 to 10.0 units/ml.)	4	12.9
Resistant (more than 10.0 units/ml.) (in this study, more than 8)	5	16.1
	31	100.0
Bacitracin[10]		
Very sensitive (up to 0.5 unit/ml.)	5	16.1 } 71.0%
Sensitive (0.5 to 5.0 units/ml.)	17	54.9 } sensitive
Resistant (more than 5.0 units/ml.)	9	29.0
	31	100.0
Streptomycin[11]		
Sensitive (up to 5.0 μg./ml.)	1	3.2
Moderately resistant to resistant (more than 5.0 μg./ml.)	30	96.8
	31	100.0
Erythromycin		
Sensitive (up to 0.5 μg./ml.)	10	43.5
Moderately resistant (0.5 to 1.0 μg./ml.)	9	39.1
Resistant (more than 1.0 μg./ml.)	4	17.4
	23	100.0
Polymyxin B		
No effect (23 cultures)		

Because of the limitation of facilities, only 23 cultures were examined for their resistance to erythromycin but, here again, there is definite similarity in these results with the statement of Pittenger *et al.*[12] that "the specific activity of erythromycin . . . is . . . only slightly less on a weight basis than that of penicillin or chlortetracycline. . . ." These workers also state "streptomycin is considerably less active than any of the above;" the results here reported substantiate the observation that streptomycin is ineffective against Staphylococcus and Pseudomonas organisms.

Polymyxin B showed no activity against any of the cultures examined. This result was not unexpected, since the resistance of staphylococci to this antibiotic has been well established.

The marked disparity between the *in vivo* and *in vitro* effectiveness of antibiotics commonly used in the treatment of mastitis strongly suggests that factors other than the bacteria are involved. When the character and extent of the pathological changes in mastitis are considered,

with their associated barriers to antibiotic penetration, it appears that the drugs are not reaching all of the infected areas. Even the parenteral administration of large doses of antibiotics have not produced satisfactory results. Possibly greater consideration should be given to combined parenteral and local therapy and to the vehicles used in the preparations for administration by either or both routes.

SUMMARY

In vitro evaluation of antibiotic effectiveness against 31 cultures of *Staphylococcus aureus*, isolated from bovine mastitis cases which had been refractory to all treatment, showed 71 per cent to be sensitive to penicillin and 71 per cent to bacitracin. The activity of erythromycin paralleled, essentially, that of penicillin.

In an individual bacterial strain, there appeared to be no direct relationship in sensitivities to each of the antibiotics.

Neither streptomycin nor polymyxin B were effective against any of the strains of *Staph. aureus* involved in this study, confirming current knowledge.

It appears that improvement in the method or in the vehicle for transporting the antibiotic preparation to the foci of mastitic infection requires greater consideration.

References

[1]Ford, C. M., and Wilson, J. B.: The Penicillin Resistance of *Streptococcus Agalactiae* Isolated Before and After Penicillin Therapy. Cornell Vet., *42*, (1952): 291-295.

[2]Long, P. H.: Bacterial Resistance as a Factor in Antibiotic Therapy. Bull. New York Acad. Med., *28*, (1952): 809-816.

[3]Knight, V.: Influence of Antibiotic Treatment on the Rate of Acquisition by Patients of Multiple Drug-Resistant Phage Group III Staphylococci Indigenous to a Hospital. J. Clin. Invest. *33*, (1954): 949.

[4]Andreu, Enjalbert, Monnier, Quercy, and Desusclade: Un probleme d'actualite les staphylocoques penicillinoresistants. Toulouse med., *51*, (1950): 643-649.

[5]Oswald, E. J., Reedy, R. J., Randall, W. A., and Welch, H.: Penicillin Resistance Encountered in Staphylococci Isolated from Selected Groups. Antibiotics Ann., 1st ed. Medical Encyclopedia, Inc., New York, N.Y. (1953): 318-321.

[6]Schalm, O. W., and Woods, G. M.: *Micrococcus Pyogenes* in Bovine Milk. II. Relationship of Shedding Characteristics to Occurrence of Clinical Mastitis. Am. J. Vet. Res., *14*, (1953): 534-538.

[7]Edwards, S. J.: Antibiotic Therapy in Staphylococcal Infection of the Bovine Udder. J. Comp. Path., *64*, (1954): 275-280.

[8]Alford, J. A., Lusi, H., and McCrory, H. F.: Antibiotic-Resistant Micrococci in Subclinical Mastitis. J.A.V.M.A., *126*, (1955): 294-295.

[9]Welch, H., and Lewis, C. N.: Antibiotic Therapy. 1st ed. Arundel Press, Washington, D.C. (1951): 53.

[10]Welch, H., and Lewis, C. N.: Antibiotic Therapy. 1st ed. Arundel Press, Washington, D.C. (1951): 125.

[11]Welch, H., and Lewis, C. N.: Antibiotic Therapy. 1st ed. Arundel Press, Washington, D.C. (1951): 91.

[12]Pittenger, R. C., Wolfe, R. N., and Marks, P. N.: The Action of Erythromycin Against *Micrococcus Pyogenes* Variety *Aureus in Vitro*. Antibiotics Ann. 1st ed. Medical Encyclopedia, Inc., New York, N.Y. (1953): 449-459.

Therapy for Amebiasis in Man

A water-borne epidemic of amebiasis, presumably all due to *Endamoeba histolytica*, was studied in Indiana. Approximately 400 patients were treated, each with oxytetracycline (terramycin®), an approved amebacide, and with fumagillin, a new antibiotic. They were equally effective, over 93 per cent of the patients being free of the infection four months later. Side effects were mild; the complaints were about equal for the two groups. For oxytetracycline they were diarrhea, anal itching, and prolonged rectal irritation; for fumagillin, they were dizziness, weakness, a typical skin rash, and gastric irritation. —*J.Am.M.A., Nov. 5, 1955.*

Fumagillin for Amebiasis in Man.—Fumagillin, the antibiotic which has only slight antibacterial action but definite activity against *Endamoeba histolytica*, in doses of 30 mg. daily for 12 days was effective, without side reactions, in 70 per cent of intestinal amebiasis cases in man. —*Antibiotic Med., June, 1955.*

Penicillin for Swine Erysipelas

Penicillin is the most effective and economical treatment for swine with acute erysipelas. However, since 10 to 15 per cent suffer a remission on the second or third day, when the aqeous solution is used, it should be repeated once or twice, or until the second day following the drop in temperature. Pigs which recover seem to be immune. Unaffected pigs in the herd should be vaccinated.—*A. H. Poliakov, veterinarian and director, All-Union Inst. Vet. Ectoparasit., Mycol., and San., Moscow.*

Gapeworm (*Cyathostoma Bronchialis*) Infection in a Duck

E. L. STUBBS, V.M.D.

Philadelphia, Pennsylvania

A young white Peking duck was brought to the author by a student from the Medical School (University of Pennsylvania) with belief that something was wrong with the neck of the duck. Examination showed

Fig. 1—Cyathostoma bronchialis in the trachea and bronchi of a duck.

the supposed swelling to be the crop. The duck was thin, with a misshapen chest. Destruction was advised. Necropsy showed emaciation with large numbers of gapeworms in the trachea and bronchi (fig. 1). This constituted a new finding and some worms were removed (fig. 2) and submitted to the Zoological Division of the U. S. Department of Agriculture in Washington where they were identified as *Cyathostoma bronchialis*. The Zoological Division had no record of this parasite having been found in ducks in North America.

An attempt to find out where the duck originated failed.

Griffiths *et al.*[1] described this parasite and reported:

> In 1928, Cram recorded gapeworm infections in wild geese raised in captivity in north central Illinois. Although species of Cyathostoma have been reported as being widespread in domestic geese in Europe, the only report of members of this genus in water birds on this continent, prior to that of Cram, was in a swan in Ithaca, N. Y., in 1920. The specimen from the swan was a single female in a poor state of preservation. In a review of this genus in 1923, Chapin considers this specimen to resemble *C. bronchialis*. In 1932, Christenson reported *C. bronchialis* from the Canada goose *(Branta canadensis)*, the bean goose *(Anser fabalis)*, and the blue goose *(Chen caerulescens)*. These geese were raised in captivity in Minnesota for exhibition purposes.

Fig. 2—Cyathostoma bronchialis from the bronchi of a duck.

Dr. Stubbs is on the faculty of the School of Veterinary Medicine, University of Pennsylvania.

[1]Griffiths, H. J., Leary, R. M., and Fenstermacher, R.: A New Record for Gapeworm (Cyathostoma Bronchialis) Infection of Domestic Geese in North America. Am. J. Vet. Res., 15, (1954): 298-299.

Anemia in Ducks from Chloromycetin

Anemia was produced in white Pekin ducks by the oral administration of chloramphenicol (chloromycetin®), even though ducks are much more resistant to the effects of this antibiotic than is man. The drug apparently affected the erythroblasts within the bone marrow which resulted in a rapid decrease in the number of reticulocytes in peripheral blood.—*Vet. Bull., Oct., 1955.*

Streptomycin for Infectious Coryza

Hens in Israel affected with infectious coryza not only made a clinical recovery in 24 to 48 hours, but they also returned to excellent egg production in four to ten days when each was given intramuscularly, 0.2 Gm. of dihydrostreptomycin sulfate.—*Poult. Sci., July, 1955.*

The Incidence of Intestinal Helminths in Dogs and Cats in Knoxville, Tennessee

H. CIORDIA, Ph.D., and A. W. JONES, Ph.D.

Knoxville, Tennessee

While searching for *Taenia pisiformis* and *Hydatigera taeniaeformis* in dogs and cats for use in our studies of the effect of irradiation on these worms and their hosts, it was decided to keep a record of the intestinal helminths encountered.

During our search, 68 dogs and 12 cats were examined, most of which were procured from the humane officer of Knoxville. No effort was undertaken to determine their ages, but it is possible that most of them were relatively old. Many were in poor physical condition.

Although the variety of species of intestinal helminths represented in the dogs (table 1) was somewhat disappointing, nevertheless all the dogs examined were parasitized; 24 per cent with one species, 32 per cent with two, 37 per cent with three, and 7 per cent with four species. Only five species of helminths were found.

Dipylidium caninum was the most predominant parasite, being present in 68 per cent of the dogs as well as being found in the largest numbers. The number of these worms and the frequency of infestation among the dogs examined coincides closely to the findings of Rubin[1] in Oklahoma. Of the 68 dogs, 7 (10%) harbored *T. pisiformis* together with *D. caninum*, and 48 (70%) were parasitized with one or both of these species of tapeworms.

The degree of parasitism by helminths was not as great among the cats. Only 9 (75%) of the cats were parasitized with one or more of five species as follows: *Ancylostoma caninum* (34%), *Toxocara cati* (42%), *Toxocara felis* (8%), *D. caninum* (8%), and *H. taeniaeformis* (17%). Five cats (40%) harbored more than one species of worms. The number of cats examined was too small to draw any definite conclusions.

A fecal examination was performed on 1 of the cats before it was euthanized. Eggs morphologically resembling those of *Ascaris lumbricoides* (*A. suum*) were seen but, as expected, adults of that parasite were not found when the digestive tract was examined. This cat probably was an accidental host, the eggs merely passing undigested through its digestive tract.

No trematodes were recovered from either the cats or dogs.

TABLE 1—Summary of Helminths in 68 Dogs from Knoxville, Tenn.

Parasite	No. animals infested	Percentage of infestation	No. parasites per animal
Dipylidium caninum	46	68	1 to 178
Taenia pisiformis	11	16	1 to 18
Ancylostoma caninum	44	62	1 to 49
Toxocara canis	14	21	1 to 19
Trichuris vulpis	39	57	1 to 48

The degree of parasitism of dogs with intestinal helminths is probably not significantly different from that of dogs in other parts of the country, as mentioned by Wright[2] and Rubin.[1] The prevalence of the various species found in our dogs falls within the ranges reported by Rubin.

References

[1]Rubin, R.: A Survey of Intestinal Parasites of 100 Dogs in Oklahoma County, Oklahoma. J.A.V.M.A., *121*, (1952): 30-33.

[2]Wright, W. H.: The Incidence of Internal Parasites in Dogs at Washington, D. C. J.A.V.M.A., *76*, (1930): 794-803.

From the Department of Zoology and Entomology, University of Tennessee, Knoxville.

This study was carried out under contract No. (40-1)-1749 for the United States Atomic Energy Commission at the University of Tennessee.

The authors thank Mr. Walter Montgomery, humane officer for Knoxville, Tenn., for his cooperation.

Sense of Hearing in the Dog

The dog's sense of hearing excels that of man in three respects: The dog can hear higher tones, fainter sounds, and can more accurately localize the point from which a sound has come. Dogs are reported to hear tones at 70,000 to 100,000 cycles which is 5 times higher than the human ear can hear. The dog's hearing is most acute at about 4,000 cycles, man's at about 2,000 vibrations per second. A dog can hear a sound at 80 feet which man could not detect beyond 20 feet.—*W. A. Young, D.V.M., California.*

Pulmonary Carcinomas of the Dog.—Five primary lung tumors are reported in dogs. One was a bronchial columnar-cell carcinoma, three were epidermoid bronchial carcinomas (one, a squamous metaplastic type), and one was a histiocytoma which probably originated from alveolar cells.—*Vet. Bull., Oct., 1955.*

Protozoan Diarrhea in a Dog

FRANK A. HAYES, D.V.M., and
CHARLES C. KING, D.V.M.

Athens, Georgia

Recent reports[1-3] have emphasized the pathogenic potentialities of intestinal protozoa for dogs. With few exceptions,[4] these parasites have received a minimum of attention.[5] Only limited efforts have been made to actually establish a possible etiology for the numerous, nonspecific diarrheal cases encountered in the average small animal practice. Although the exact significance of the intestinal flagellates is not known, an increasing amount of information is being compiled to incriminate these organisms as at least a contributing factor to many enteric disorders.

The following case is reported as a possible contribution toward further awareness for this type of infection.

Case Report.—A 3-month-old Boxer weighing approximately 15 lb., when admitted for otoplasty, appeared to be in excellent physical condition. Five days following surgery, a profuse, frothy-type diarrhea developed. Although the patient's appetite remained normal, there was a rapid weight loss and subsequent emaciation. By employing a direct saline smear technique,[6,7] microscopic examination of a single fecal specimen revealed numerous intestinal flagellates of the Trichomonas sp.[8] No helminth ova were found.

Twenty-four hours following diagnosis, specific therapy was inaugurated. A "high enema" of carbarsone®* (0.5%) was administered under pressure,[3,9-12] using an aqueous solution of sodium bicarbonate and green soap (25 to 1.0%, respective ratio) as a vehicle.[12] Initial administration consisted of 250 cc. of this suspension, followed by five treatments with 100 cc. given at 12-hour intervals. Shortly after the first enema, the number of trophozoites was observed to diminish rapidly, and after the third enema they could no longer be demonstrated. Each day thereafter the consistency of the feces became more firm.

On the third day after the commencement of carbarsone therapy, organisms of the Giardia sp., in the encysted stage, were identified by fecal examination.[3,5,8,13] The patient was dismissed from the clinic, however, and atabrine®† was dispensed for treatment of the latter condition.[3,13,14] The drug was to be administered orally, 100 mg. once daily for ten days. No additional medication was supplied.

Four days following release, the animal showed a complete cessation of clinical signs, and a definite improvement in both spirit and condition. Two weeks later, the animal was found to be in excellent physical condition.

From the Department of Pathology and Parasitology, School of Veterinary Medicine, University of Georgia, Athens.

*Eli Lilly and Co., Indianapolis, Ind.

References

[1]Hoskins, H. P., Lacroix, J. V., and Mayer, K.: Canine Medicine. American Veterinary Publications, Inc., Evanston, Ill., 1953.

[2]O'donnell, F. A.: Intestinal Trichomoniasis in a Dog. Vet. Med., *49*, (1954): 390.

[3]Greene, J. E., and Thorson, R. E.: Canine Intestinal Protozoa as Related to Enteritis. Gaines vet. symposium, *4*, (1954): 6.

[4]Bruce, K. L.: Trichomoniasis in a Puppy. Vet. Med., *36*, (1941): 261.

[5]Morgan, B. B., and Hawkins, P. A.: Veterinary Protozoology. Burgess Publishing Co., Minneapolis, Minn., 1948.

[6]Koutz, F. R., and Rebrassier, R. E.: Identification and Life Cycles of Parasites Affecting Domestic Animals. Ohio State University Press, Columbus, Ohio, 1948.

[7]University of Illinois, Agricultural Experiment Staiton, Urbana, Ill.: Microscopic Diagnosis of Parasitism in Domestic Animals. Circular 698, 1952.

[8]Kudo, R. R.: Protozoology. 3rd ed. Charles C. Thomas, Springfield, Ill., 1947.

[9]Hagner, R., and Eskridge, L.: Elimination and Cross Infection Experiments with Trichomonads from Fowls, Rats, and Man. Am. J. Hyg., *21*, (1935): 135.

[10]Gabaldon, A.: Carbarsone: Its Action on the Intestinal Trichomonads in Rats *in Vivo*. Am. J. Trop. Med., *16*, (1936): 621.

[11]The Upjohn Company: Physicians Desk Reference to Pharmaceutical Specialties and Biologicals. 8th ed. Medical Economics Inc., Rutherford, N. J., 1954.

[12]Bedell, D. M.: Personal communication, 1955.

[13]Choquette, L. P. E.: Canine Giardiasis and Its Treatment with Atebrin. Canad. J. Comp. Med., *14*, (1950): 230.

[14]Belding, D. L.: Textbook of Clinical Parasitology. Appleton-Century-Crofts, Inc., New York, N. Y., 1952.

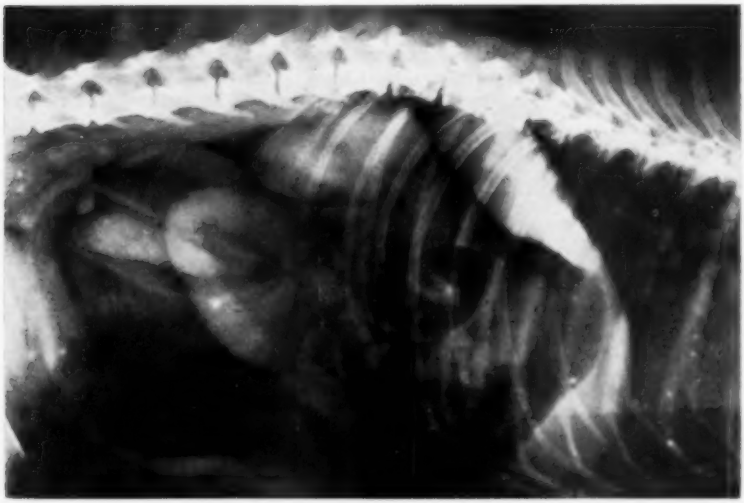
†Winthrop-Stearns, Inc., New York, N. Y.

Are Dogs Color Blind?

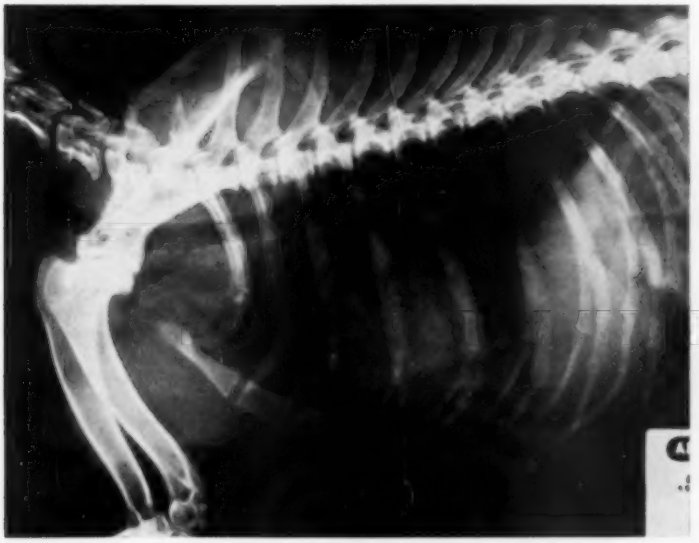
Most authorities believe that to a dog all objects are some shade of gray. The guide dog does not read traffic lights by color; he judges by sound and by flow of traffic.—*Dog World, Oct., 1955.*

What Is Your Diagnosis?

Make your diagnosis from the picture below — then turn the page ▸



History.—While grooming a 9-year-old Cocker Spaniel, a spayed female, a movable mass in the abdomen was discovered. After these radiographs of the abdomen and thorax were made by the veterinarian, an operation was advised. The owner stated that the dog had never been sick and had never had a bowel or urinary disturbance.



Here Is the Diagnosis

(*Continued from preceding page*)

Diagnosis.—Adenocarcinoma of the kidney.

Comments.—From palpation, it was impossible to identify the mass. As the radiograph of the thorax was negative for metastatic tumor, it was decided to do an exploratory laparotomy. The mass proved to be pendulous and was hanging in a peritonized sac which allowed it to be delivered and removed through a midline abdominal incision. The mass was an adenocarcinoma of the kidney with no metastases in other organs. The other kidney appeared normal. Recovery was satisfactory. This radiograph (fig. 1) was taken after 300 cc. of air had been injected into the abdominal cavity.

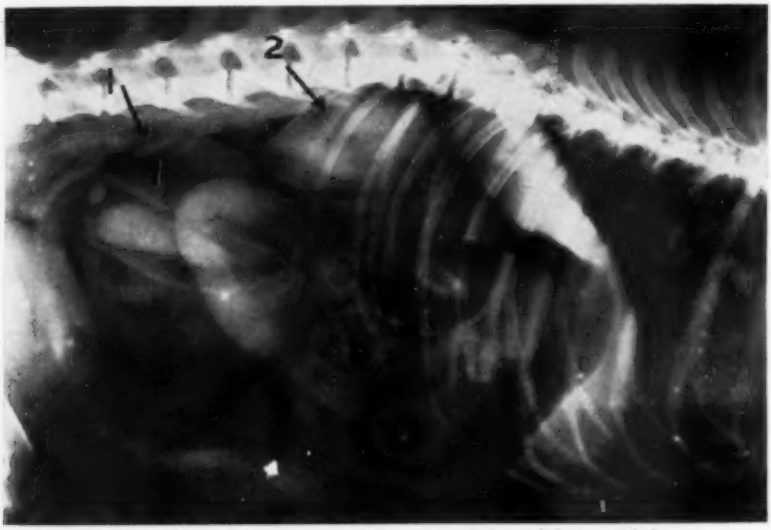


Fig. 1—Radiograph of abdomen: (1) tumorous kidney; (2) normal kidney.

Fig. 2—Tumorous kidney.

This case was submitted by Dr. W. C. Glenney, Ardmore, Pa.

Nocardiosis (Actinomycosis) in the Dog

A Report of Six Cases

LLOYD C. MOSS, D.V.M.

Fort Collins, Colorado

THERE HAS BEEN some confusion in the reporting and classification of some fungous diseases and, as Riser[1] has stated, a review of the literature indicates that *Nocardia asteroides* has been reported under at least 12 generic names. The classification of Conant[2] as revised by Moss and McQuown[3] has helped to simplify the understanding of mycology.

The Actinomycetaceae includes *Actinomyces bovis* and *Nocardia asteroides*. *Actinomyces bovis* has not been isolated from the soil and has been found to be a normal inhabitant of the mucous membranes and mouths of man and cattle. The genus Nocardia is named for Edmund I. E. Nocard (1850-1903), French veterinarian who isolated the organism from bovine farcy. This organism was later named *Nocardia farcinica*. *Nocardia asteroides* has been isolated from the soil and it is believed that the infection can be air-borne. Nocardia is an aerobic organism with world-wide distribution.

Thordal-Christensen and Clifford[4] stated that: "the term 'actinomycosis' has been employed in the literature to denote this type of infection; however, according to the modern nomenclature, this case was diagnosed as nocardiosis." The animal referred to in their report, a 7-month-old German Shepherd, had normal footpads which later became hyperkeratinized. It died after 20 days of hospitalization. Necropsy revealed extensive lesions in the thoracic and abdominal cavities caused by *Actinomyces asteroides* or *N. asteroides*. The organism cultured had a distinctly moldy odor which resembled garden soil.

A case reported by Bohl *et al.*[5] and 2 reported by Cross *et al.*[6] suggested that nocardiosis may be complicated by distemper or manifest many of the symptoms of the distemper complex. Blake[7] reported cases in 2 young dogs, a Cocker Spaniel and a Collie, which resembled the distemper complex and could be classified, on gross changes, as possible distemper. Histopathological and mycological studies were performed to determine the etiology.

Menges, Larsh, and Habermann[8] reported 1 case in which *A. bovis* was isolated and another in which the diagnosis was based on the histopathological finding of gram-positive, branching filaments, 0.2 to 0.3 mm. in diameter.

CASE REPORTS (COLORADO A. & M. COLLEGE)

Three animals presented at the veterinary clinic had extensive thoracic lesions, 1 had abdominal lesions and peritonitis, and 1 a submaxillary abscess. A sixth animal, infected experimentally by intrathoracic inoculation of pleural exudate from case 2, died 40 days after inoculation (tables 1, 2).

Case 1.*—An 18-month-old spayed mixed Terrier was obtained from a Denver dog pound when she was 6 months old. She had been ailing since an ovariohysterectomy in March, 1953. She gradually went off feed and became listless but showed no vomiting or diarrhea. Some days she seemed to feel well and was moderately active (tables 1, 2).

She was thin, listless, emaciated, and de-

Fig. 1—Radiological diagnosis of gangrenous pneumonia in a Terrier (case 1).

Presented at the sixteenth annual veterinary conference, Feb. 22, 1955, Colorado A. & M. College, Fort Collins.

Dr. Moss is professor and head, Department of Medicine, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins.

*The dog was referred by Dr. George Propp, Loveland, Colo.

hydrated. Her respiration was fast, labored, jerky or spasmodic in nature, with a sort of tic movement of the lower jaw synchronized with the respirations. A tentative diagnosis of diaphragmatic hernia was made. Her blood count was: erythrocytes, 2,970,000; leukocytes, 14,300; neutrophils (segmenters), 29; neutrophils (bands), 41; lymphocytes, 28; eosinophils, 2.

A radiograph of the thoracic cavity was interpreted as showing gangrenous pneumonia (fig. 1, 2). The dog died the following day while receiving a blood transfusion.

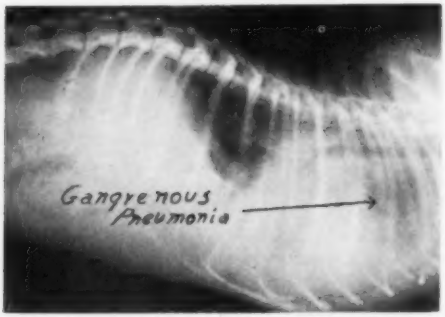


Fig. 2—Area in thoracic cavity of Terrier (case 1) indicated as gangrenous pneumonia by radiologist.

Histopathology revealed villose proliferation of fibrin and marked vascularization of the pleura. The fibrinous tissue contained many neutrophils, lymphocytes, and phagocytes and several foci of bacteria resembling actinomycosis. The lungs were atelectatic, hyperemic, and showed some fibrosis.

The diagnosis was actinomycotic nocardiosis pleuritis.

Case 2.—A 4-year-old female German Shepherd, submitted on March 30, 1953, had been listless and anorexic for two days. The tentative diagnosis was pleuritis. She died suddenly several hours after admission, apparently from internal hemorrhage.

On necropsy, her lungs showed an extremely hemorrhagic pleuritis (fig. 3) with villose-like proliferations. No material was submitted for mycological study.

Case 3.—On July 17, 1953, a 5½-year-old female hound was submitted at the clinic, dehydrated, in poor general condition, and with a temperature of 100.8 F. She was born in Utah but was raised and used for hunting mountain lions in Colorado. She had been bred June 3, and the owner attempted to prevent conception by irrigation of the genital tract. Her eyes were inflamed at the time of the breeding and she was at that time treated with aureomycin® and a blood transfusion. Since then she had become progressively more ill.

When she was brought to the clinic, her

TABLE I—History and Symptomatology of 6 Cases of Canine Nocardiosis

Case (No.)	Age, breed sex	Temp. (F.)	History	General condition	Respiratory signs	Other signs
1	1½ yr., Terrier, F.	102.8	Spayed 9 mo., had not been well since	Poor, listless, anorexia	Dyspnea, pleuritis, pneumonia	Skin dehydrated
2	4 yr., German Shepherd, F.	102.0	Listless 1 mo., acute 4 hr.	Good, membranes pale	Pleuritis	None
3	5 yr., Hound, F.	101.0 103.0	Ill 2 mo.	Poor, listless, anorexia	Pleuritis, pneumonia, dyspnea	Skin dehydrated
4	4 yr., Labrador Retriever, M.	103.0	Distended abdomen 2 mo.	Poor, listless, anorexia	None	Large mass in abdomen
5	1 yr., Weimaraner, M.	102.0	Growth ventral to neck 6 mo.	Good	None	None
6 Exper. case	4 mo., German Shepherd (?)	—	Inoculated with material from case 2; sudden death in 40 days	Good	Plueritis, pneumonia	None

blood was negative for *Dirofilaria immitis*, and the urea nitrogen was 18.7 mg./100 cc.

The next day her appetite was poor but the bowel movement was normal. She was given 250 cc. of aminosol (Abbott) intravenously, and 300 cc. of 5 per cent dextrose in saline, subcutaneously. On July 19, her temperature was 103.0 F., so the supportive treatment was continued and terramycin,® 125 mg., was given intravenously for three days. Her blood counts showed the following:

	July 17	July 21
Erythrocytes	5,450,000	4,400,000
Leukocytes	30,850	12,800
Neutrophils (segmenters)	68	13
Neutrophils (bands)	15	50
Lymphocytes	12	32
Monocytes	5	2
Eosinophils	0	3

Radiographs showed a collapsed left lung (fig. 4) and opacity of the ventral thorax (fig. 5). Fluid, aspirated from the thoracic cavity, when cultured produced *Pasteurella multocida* and diphtheroids.

The dog died July 29. Necropsy revealed (table 2) emaciation, edema of the sternal region, and 2 liters of serohemorrhagic fluid in the thoracic cavity. There were hemorrhagic fibrinous pleuritis and granulomatous, villi-like proliferations (fig. 6).

Histopathology of the lungs showed hyperemia, atelectasis, emphysema, extensive fibrosis, hemorrhage, leukocytic infiltration, and silicosis. The kidneys were hyperemic and autolytic; cystlike spaces in the medulla were filled with blood; albuminous casts were found in the tubules and necrosis and mild leukocytic infiltration in the tubular epithelium. The intestines were hyperemic, with leukocytic infiltration, des-

Fig. 3—Lesion from the pleura of a dog (case 2). The arrow indicates the filamentous organisms; notice the hemorrhage. Gram's stain.

TABLE 2—Necropsy Findings on Cases of Canine Nocardiosis

Case	Thoracic	Abdominal	Gross	Histopathological	Mycological
1	Pericarditis, atelectasis, pneumonia, pleuritis	Liver congested and yellow	Suppurative pleuritis	Nocardial pleuritis	Not cultured
2	Hemorrhagic pleuritis with sulfur-like granules, atelectasis	None	Actinomycotic (nocardial) pleuritis	Nocardiosis	Not cultured
3	Fibrinous pericarditis; collapsed lungs, pleuritis with granulomatous proliferations and effusion	Liver congested, thick black bile, catarrhal enteritis, tapeworms	Suspect actinomycosis (nocardiosis)	Gram-positive branching	Not cultured
4	Tracheitis	Tumorous mass, peritonitis	Peritonitis	Gram-positive filamentous microorganisms	Not cultured
5	Recovered after removal of abscess				
6 Exper. case	Bronchopneumonia; pleuritis with fibrosis, hemorrhages, and sulfur-like granules	None	Pleuritis	Gram-positive filaments	Not successful

Fig. 4—Radiograph, taken after hound (case 3) had been given barium meal, showing pneumothorax (left); the diaphragm is not outlined.

quamation, and autolysis of the mucosa. The liver was hyperemic, the sinusoids were congested with blood, and there was central necrosis, cirrhosis, and hemosiderosis. The pleura showed proliferation of fibrous, granulomatous masses that were highly vascular, with heavy infiltrations of leukocytes and areas of hemorrhage. Colonies of gram-positive, branching filaments typical of actinomycosis (nocardiosis) were found.

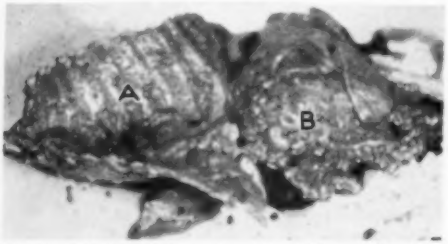


Fig. 6—Interior of thoracic cavity of hound (case 3) showing extensive hemorrhagic pleuritis, with granulomatous, villose-like proliferations on the parietal (A) and visceral (B) pleura.

Case 4.†—On June 1, 1954, a 4-year-old male Labrador Retriever was referred to the clinic with what was diagnosed as a tumor of the abdomen (fig. 7).

The hemogram showed: erythrocytes, 5,200,000; leukocytes, 3,650; neutrophils (segmenters), 72; neutrophils (bands), 4; lymphocytes, 19; monocytes, 2; eosinophils, 3.

The blood chemistry showed urea nitrogen, 14 mg./100 cc., and the van den Berghs' test, both direct and indirect, was negative. Because of the abdominal mass, exploratory laparotomy was attempted on June 3, 1954. The 10-cm. mass could not be removed so euthanasia was performed.

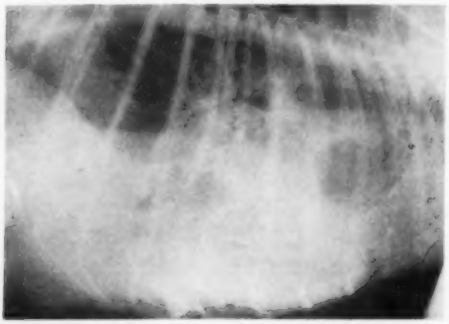


Fig. 5—Radiograph of thoracic cavity of hound (case 3) showing obliteration of outline of heart and ventral portion of diaphragm.

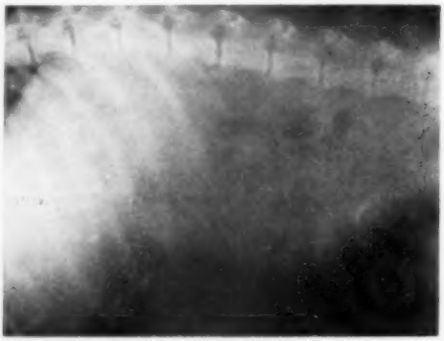


Fig. 7—Tumorous mass, with extensive peritonitis in abdomen of Labrador Retriever (case 4).

†The dog was referred by Dr. Truman I. Means, Fort Collins, Colo.

Necropsy revealed a slight tracheitis, extensive peritonitis, old scars on the liver associated with fatty metamorphosis, and fibrin on the serosal surface of the stomach.

Histological sections of the mass showed heavy infiltration of neutrophils and mononuclear cells with large, centrally located colonies of blue-staining, branching, filamentous structures.

The diagnosis was actinomycosis (nocardiosis).

Case 5.—On July 7, 1954, a 1-year-old male Weimaraner was brought to the clinic because of an abscess of six months' duration on its neck (fig. 8). The dog had received two penicillin injections three months previously but no treatment since then.

His temperature was 102 F., and his general condition was good. There was a growth 10 by 6 by 5 cm. on the right side of the neck in the region of, but not involving, the thyroid gland. Tracts extended anterodorsally toward the parotid gland. The granuloma was excised, penicillin and streptomycin were administered for six days, and since there was no rise in temperature the dog was discharged on July 24.

The mass, when examined histopathologically, contained colonies of gram-positive, filamentous, nonbranching bacteria. Chronic inflammatory reaction surrounded the infection.

A diagnosis of actinomycosis (nocardiosis) was made.

Inoculated Animals (*Case 6*).—Two, 4-month-old mixed Shepherd puppies, litter mates, were inoculated with material from the chest cavity of the animal described in case 2. One, inoculated intravenously, failed to develop signs of infection and was negative on necropsy when killed six months later.

The second puppy (case 6) was inoculated intrathoracically on March 31, 1953, and died 40 days later. Necropsy revealed a purulent pleuritis with some fibrosis and hemorrhages, a thoracic cavity containing seropurulent fluid, and bronchopneumonia.

Histopathology revealed that the villose-like proliferation of the pleura consisted of fibrinous tissue, macrophages, and leukocytes. The proliferation was highly vascular and the vessels contained what appeared to be filamentous organisms. Sulfur-like granules containing filamentous organisms were also present. These branching

Fig. 8—The Weimaraner (case 5) under anesthesia for excision of actinomycotic abscess of six months' duration on its neck.

filaments, also present in the tissue, showed terminal buds or spores. This may have been fibrin but due to the terminal bodies they were thought to be microorganisms.

The lungs were hyperemic, the alveoli contained leukocytes and phagocytes, focal areas were necrotic, and some alveoli contained serum and fibrin. Granules of exudate containing branching, gram-positive filaments were surrounded by acid-staining debris.

The diagnosis was actinomycotic pleuritis. An effort was made by the bacteriology department to cultivate the organism, without success.

SUMMARY

Five acquired and 1 experimental case of nocardiosis in the dog are reported. Diagnoses are based on histopathological examinations.

References

[1]Riser, Wayne H.: Mycotic Diseases, in "Canine Medicine." American Veterinary Publications, Inc., Evanston, Ill. (1953): 437.

[2]Conant, N. F., *et al.*: Manual of Clinical Mycology. 2nd ed. Saunders Co., Philadelphia, Pa., 1954.

[3]Moss, E. S., and McQuown, A. L.: Atlas of Medical Mycology, Williams & Wilkins Co., Baltimore, Md., 1953.

[4]Thordal-Christensen, Aage, and Clifford, Donald Hansen: Actinomycosis (Nocardiosis) in a Dog with a Brief Review of this Disease. Am. J. Vet. Res., *14*, (1953): 298-306.

[5]Bohl, E. H., Jones, D. O., Farrell, R. L. Cham-

berlain, D. M., Cole, C. R., and Ferguson, L. C.: Nocardiosis in the Dog. J.A.V.M.A., *122,* (1953): 81-85.

[6]Cross, R. F., Nagao, W. T., and Morrison, R. H.: Canine Nocardiosis—A Report of Two Cases. J.A.V.M.A., *123,* (1953): 535-536.

[7]Blake, W. P.: A Report of Two Canine Cases of Nocardiosis in Missouri. J.A.V.M.A., *125,* (1954): 467-468.

[8]Menges, Robert W., Larsh, Howard W., and Habermann, Robert T.: Canine Actinomycosis. J.A.V.M.A. *122,* (1953): 73-78.

Antirabies Treatment

Research, in which rabies was induced in guinea pigs, indicated that the mortality could be reduced from about 90 to about 70 per cent by cauterizing the wounds with carbolic acid or nitric acid within four hours of infection, and to about 75 per cent if cauterized within 24 hours. The topical application and infiltration of the wound cite with anti-rabies serum four hours after infection had little or no value. Cauterization, followed by a course of anti-rabies vaccine, reduced mortality to between 27 and 40 per cent. By giving anti-rabies serum 24 hours after infection, followed in another 24 hours by a course of the vaccine, the mortality was reduced to 30 per cent. Even better results could be expected if this therapy were preceded by cauterization as a first-aid measure.—*Indian J. M. Res., July, 1955.*

Rabies in Fowl in Germany.—A recent occurrence of rabies in chickens in Germany has been reported. Rabies has previously been reported in ducks, geese, fowl, buzzards, hawks, magpies, owls, crows, and sparrows. Affected birds show nervous symptoms and may attack animals or man. —*Vet. Bull., Oct., 1955.*

Rabid Rat Attacks Boy

A rat which bit the face of an 8-year-old boy while he was asleep in a bed was found to have Negri bodies. Three of 4 mice inoculated with the rat's brain were Negri-positive, and 1 in a second series died of typical rabies. The boy was given hyperimmune serum and an intensive course of anti-rabies vaccine and was normal several weeks later. Rabies had not been reported in this Georgia county for ten months, when a dog was microscopically negative but positive to mouse inoculation.—*Pub. Health Service, Dec. 15, 1955.*

Aujeszky's Disease in Georgia Swine

Aujeszky's disease has been diagnosed in several swine by the Tifton Diagnostic Laboratory. Pigs under 6 weeks old usually die while those over 14 weeks usually recover. Anti-hog cholera serum produced in the Middlewest seems to carry a high titer of antibodies against this disease. It seems to have preventive qualities but is of little benefit for pigs showing symptoms.—*Georgia Vet., July, 1955.*

Temperature Effect on Chickens

Chicks maintained in a brooder at 86 F. grew faster than those maintained at 67 F. (all were started at 95 F.). Those at 86 F. developed more rapidly, sexually, but those at 67 F. feathered first. The optimum temperature for laying hens was 55 F., egg production falling at less than 40 F. and above 70 F. Hens maintained at 23 F. ate 12.3 lb. of feed per pound of eggs laid; at 85 F., 4 lb. of feed; and at 55 F., 3.5 lb.—*World's Poult. Sci. J., July, 1955.*

Malayan Buffalo Husbandry

The swamp buffalo, indigenous in Malaya, has an average gestation period of about 330 days and the succeeding conception rarely occurs sooner than 230 days; thus a calf is produced approximately every 18 months. Mating usually occurs during the night but may be observed during dawn and sunset, the desire seeming to diminish during the heat of the midday when the animal seeks shelter in shady areas and in ponds.—*J. Malayan V.M.A., March, 1955.*

Terramycin for Fowl Cholera

Feeding terramycin® to chickens at the rate of 0.22 per cent of the mash for 24 hours protected them against infection *per os* with visceral matter from Pasteurella-infected birds, which caused the disease in untreated controls. After 20 days, 10 of the treated fowl that had resisted infection were again challenged and 8 of them died from the infection.—*Vet. Bull., July, 1955.*

Penicillin V per Os Is Effective

Penicillin V, a new acid form of this antibiotic, is not affected by gastric juice but is readily absorbed from the intestine. Its antibacterial activity is quite similar to that of penicillin G, when given parenterally. For man, the dose is 200,000 units at least every four hours.—*Antibiotic Med., Sept., 1955.*

Milk Levels of Terramycin Following Infusions or Injections

Bovine milk samples were assayed for concentrations of oxytetracycline (terramycin®) according to the Grady and Williams' modification of the pad-plate method, using pyrex baking dishes as culture plates. Zones of inhibition were measured by magnifying the image of the plate approximately 75 times on a screen by means of a master vu-graph projector (Chas. Beseler Co., Newark, N. J.). Milk samples from clinically normal quarters were assayed following one 400-mg. dose of oxytetracycline, three 400-mg. doses at 24-hour intervals, and three 800-mg. doses at 24-hour intervals. After the single 400-mg. infusion, the antibiotic persisted for 24 hours or longer with an average of 37.3 hours. Repeated 400-mg. infusions showed detectable levels for an average of 45.3 hours but there was no consistent accumulation of the antibiotic as demonstrated either in the concentration attained or in the length of time it was found. Following repeated 800-mg. infusions, the drug was detected for an average of 54 hours and there were considerably greater amounts present but no consistent accumulation was noted. Marked variations occurred in concentrations in different quarters of the same cow and different cows in the same production groups, but not much variation in the length of time the drug could be detected. No demonstrable amounts of oxytetracycline could be found in the milk following 1-Gm. doses intravenously and intramuscularly. No detectable amounts were found in the milk of untreated quarters when other quarters of that cow were treated. In many instances, as long as oxytetracycline was found it was sufficient to inhibit common organisms causing mastitis with the possible exception of *Pseudomonas aeruginosa*. The lowest levels occurring between treatments were always sufficient to inhibit, but seldom to kill, *Staphylococcus aureus.*—*L. E. Barnes, Am. J. Vet. Res., (Jan., 1956) :18-23.*

Virus Pneumonia Effect on Pig Growth.—In eight experiments involving 120 weaned pigs, experimentally induced virus pneumonia depressed the growth rate to market size (200 lb.) by 16 per cent and the food conversion efficiency by 22 per cent.—*Vet. Rec., Sept. 3, 1955.*

Mules Escape Encephalomyelitis.—During an outbreak of equine encephalomyelitis in Brazil, in 1953, 17 of 152 horses in the area died while none of the 60 mules with the horses were affected. Many of the horses became blind and death occurred from three to 12 hours after the onset of symptoms.—*Vet. Bull., May, 1955.*

Botulism in Young Pheasants

On a pheasant-breeding farm in Sweden, 218 of 328 young birds died after eating the larvae of flies which had developed in carcasses of wild rabbits. The toxin titer of the larvae was low before ingestion, the crop seeming to act as an incubator for the *Clostridium botulinum.*—*Vet. Bull., June, 1955.*

Study of Crystal Violet Vaccination

In a series of experiments with crystal violet hog cholera vaccine, it was found (*Vet. Rec.*, May 28, 1955) that pigs vaccinated after weaning developed a better immunity; that 1 cc. intradermally in the ear was impractical; that 2 cc. subcutaneously in the ear developed a better immunity than 1 cc.; and that 5 cc. by the conventional methods, while more expensive, was the most satisfactory.

Pasteurella Multocida Typing Service

Dr. G. R. Carter of the Ontario Veterinary College, Guelph, Canada, would be pleased to receive cultures of *Pasteurella multocida* for serological typing. It is hoped through this project to determine the distribution of the principal serological types in the various species of animals. Persons interested in submitting strains should contact Dr. Carter.

Excess Iodide as the Primary Cause of the Inhibition of Thyroid Uptake of Radioiodine Produced by Phenothiazine, N. F. (Green)

ROY V. TALMAGE, Ph.D.; R. H. BENSON, B.S.; J. J. SZAFIR, M.S.; R. B. TURNER, Ph.D.; H. C. ALLEN, Jr., M.D.

Houston, Texas

In previous reports, Talmage *et al.*[1] showed that phenothiazine, N.F. (green), when fed to rats in prophylactic doses was able to reduce considerably the ability of the thyroid to take up radioiodine (I^{131}) from the circulation. Later, at another laboratory, Talmage *et al.*[2,3] showed that this effect could be produced in all animals tested with the drug and was due either to its iodide content or to an unknown antithyroid compound. In a final report, Nachimson *et al.*[4] compared the effects of phenothiazine and iodide administration on the inhibition of I^{131} uptake by the thyroid gland and came to the conclusion that while the effects could partially be accounted for by the presence of iodide in the drug, they were also due in part at least to the presence of an unknown antithyroid compound. These conclusions were reached primarily on the basis of their failure to find an increase in urinary iodide following the administration of large amounts of phenothiazine, N.F. (green), such as occurred following the administration of equimolar amounts of iodide to that found as a contaminant in the drug.

In experiments carried out since the publication of the reports listed above, a semiquantitative method for the determination of iodides in urine has been worked out[5] which has made it possible to determine far more accurately the amount of inorganic iodide excreted. With this improved method it has been possible to show that oral administration of phenothiazine, N. F. (green), is followed within the following 24 hours by an increase in urinary iodide corresponding to that found after administration of equimolar amounts of sodium iodide (NaI) or potassium iodide (KI). The error in the previous report[4] was due first to the inadequacy of the iodide determination, and second to the overdosage of phenothiazine and subsequent failure of the drug and its iodide content to be absorbed from the gut.

As a result of these experiments and the comparative study reported above,[4] it appears certain that the primary cause of the inhibition of radioiodine uptake by the thyroid is due to the contamination of the commercial forms of phenothiazine with readily available iodide ions. This conclusion is further corroborated by a preliminary experiment with rats maintained for ten days on an iodine-deficient ration. Following this pre-experimental period, one group was fed phenothiazine, N.F. (green), daily for seven days, a second group was fed equimolar amounts of NaI, while a third group was maintained as controls. At the conclusion of the seven-day period, blood was withdrawn from all rats for protein-bound iodine determinations. The control group showed a blood value of 3.8 μg./100 ml., while both the phenothiazine- and the iodide-fed animals showed a corresponding rise in protein-bound iodine to 6.0 μg./100 ml. While it is probable that all the phenomena related to the ability of commercial forms of phenothiazine to inhibit thyroidal uptake of radioiodine could be explained on the basis of iodide contamination, there still remains the possibility of the presence of an antithyroid compound in the drug. However, if such a compound is present, it is not in sufficient quantity to be of any significance as a factor in the use of commercial phenothiazine in therapeutic or prophylactic treatment of livestock.

The major problem remaining is whether the increased iodide administration that accompanies the use of phenothiazine is itself a factor in depressing thyroid function. While it is well known that excess iodide is capable of inhibiting the thyroid,[6,7] hypothyroidism has not been produced by iodide administration. It is suggested, however, that the use of phenothiazine supplies sufficient iodide to reduce hyperthyroidism in stock animals and possibly maintain these animals in a low euthyroid state sufficient to account for the reported gains in their weight.[8] If such be the case, it would appear that the use of phenothiazine, N.F. (green), has an additional advantage other than as an anthelmintic in the treatment of such stock animals as cattle and sheep, but that as

From the Radioisotope Unit, Veterans Administration Hospital, Baylor University College of Medicine, and the Rice Institute, Houston, Texas.

a precautionary measure only phenothiazine, N.F. (purified), should be used where any effect on thyroid function must be avoided.

References

[1]Talmage, Roy V., Nachimson, H., Kraintz, L., and Green, J. A.: The Effect of Phenothiazine, N.F. (Green) on the Uptake of I^{131} by the Rat Thyroid. Science, *118*, (1953): 191.

[2]Talmage, Roy V., Trum, B. F., Monroe, R. A., and Rust, J. H.: The Effect of Phenothiazine N.F. (Green) and Phenothiazine N.F. (Purified) on the Uptake of I^{131} by the Thyroid of the Burro. J.A.V.M.A., *123*, (1953): 328.

[3]Talmage, Roy V., Monroe, R. A., and Comar, C. L.: A Survey of the Effect of Phenothiazine on the Uptake of Radioiodine by the Thyroids of Farm Animals. J. Anim. Sci., *13*, (1954): 480.

[4]Nachimson, H. I., Benson, R. H., Szafir, J. J., Turner, R. B., Allen, H. C., and Talmage, Roy V.: Comparative Study of Effects of Phenothiazine and Iodine on Thyroid Uptake of I^{131}. Proc. Soc. Exptl. Biol. and Med., *87*, (1954): 157-162.

[5]Benson, R. H., Szafir, J. J., Turner, R. B., and Talmage, Roy V.: A Semiquantitative Method for Analysis of Urinary Iodide. In preparation.

[6]Riggs, D. S., Lavietes, P. H., and Man, E. B.: Investigations on the Nature of Blood Iodine. J. Biol. Chem., *143*, (1942): 363.

[7]Wolff, J., and Chaikoff, I. L.: The Inhibitory Action of Excess Iodide on the Synthesis of Diiodothyrosine in the Thyroid of the Normal Rat. Endocrinology, *42*, (1948): 468-471.

[8]DuPont: Phenothiazine for Greater Cattle Profits. Tech. Bull. No. 6, 1953.

Antibiotics Affect Size of Chick Thyroid

Chicks fed chlortetracycline (aureomycin®) at various levels until 4 weeks old had significantly larger thyroid glands than did controls. The increase in thyroid size was correlated with the dose of drug from 10 to 100 mg. per kilogram of feed, but above this level the increase was less. The growth of the chicks was not depressed.—*Vet. Bull., Oct., 1955.*

Cortisone in Trichinella Infection.—Mice develop a resistance to infection with *Trichinella spiralis*. When treated with cortisone, beginning before experimental infection and continuing for two weeks after, this resistance was prevented or greatly weakened.—*J. Parasitol., Oct., 1955.*

Actinomycosis in Ferrets.—Three ferrets in France developed swellings in the lower region of the neck. The pus contained numerous white granules and 2 yielded *Actinomyces israeli* and the third *Fusocillus girans*. They recovered completely after sulfonamide and iodide therapy and drainage.—*Vet. Bull., Aug., 1955.*

Albomycin, a New Russian Antibiotic

In Russia, when laboratory and clinical investigations were made of albomycin, an antibiotic prepared from *Actinomyces subtropicus*, it was found effective against gram-positive cocci, especially the staphylococci resistant to other antibiotics. It is nontoxic and well tolerated.—*Brit. J., Nov. 12, 1955.*

Antibiotics Do Increase Pig Crop.—The first positive evidence that antibiotics fed to the mothers was beneficial to the offspring resulted from feeding aureomycin® to pregnant sows. It did not increase the number or the birth weight of the pigs but the number of pigs born alive and weaned was increased.—*U.S.D.A., Oct. 17, 1955.*

Feeding High Levels of Antibiotics.—Since birds and animals apparently do not build a resistance to antibiotics, high levels can be used to effectively control certain diseases.—*Am. Feed Mfr. A., July, 1955.*

Antibiotics for "Sanitary" Pigs.—Pigs taken by hysterectomy and raised in isolation showed greater average daily gain and better feed utilization when fed aureomycin,® 10 p.p.m. for three weeks, then 200 p.p.m. for the next five weeks, than did pigs on nonsupplemented rations.—*J. Anim. Sci., Nov., 1955.*

A Test for Antibiotics in Milk.—A test has been developed which indicates the presence of antibiotics or other inhibitory substances in milk by showing a color change, due to the growth of bacteria, when incubated for a few hours.—*J. Dai. Sci., June, 1955.*

Entertoxemia in Lambs.—A 5 per cent mortality occurred in Germany from enterotoxemia (*Clostridium welchii* type D). Besides their mother's milk, the lambs were receiving concentrates. Losses were prevented in some flocks by active immunization.—*Vet. Bull., Aug., 1955.*

Allergy in a Horse

D. C. MAPLESDEN, D.V.M.; J. F. COTE, D.V.M.; D. MITCHELL, B.Sc., M.R.C.V.S.

Guelph, Ontario

On April 25, 1955, we were called to see a male Thoroughbred yearling. The rectal temperature was 102.5 F., the heart rate, 40. He appeared normal except for a small, deep puncture wound, apparently present for several days, on his neck just dorsal to the jugular furrow. The wound was cleaned and disinfected. Tetanus antitoxin was injected subcutaneously and penicillin G procaine (1.5 million I.U.) in aqueous suspension was administered intramuscularly.

On April 26 at 4 p.m. the temperature was 102.8 F., the heart rate 40, and anorexia, hyperesthesia, and stiffness were exhibited. Again 1,500,000 I.U. of aqueous penicillin was injected intramuscularly. The following morning his temperature was 103.0 F., and his heart and respiratory rates normal. Tetanus antitoxin (20,000 units) was administered subcutaneously and aqueous penicillin (3 million I.U.) was injected intramuscularly.

Fig. 1—The lesions on this colt were the result of an allergic reaction to drugs with which he was treated.

On the afternoon of April 28, the colt was showing urticarial-type lesions over the whole body down to the knees and hocks. The lesions consisted of small papules similar to those which some horsemen describe as "hives" (fig. 1). Swellings were evident at the sites of the tetanus antitoxin and aqueous penicillin injections. Pyrahistine,®* 250 mg., was injected subcutaneously. The next day, there was no change in the appearance of the urticarial reaction although a further swelling was noticed in the left gluteal region where the aqueous penicillin had been injected. Cortisone, 0.5 Gm., was injected intramuscularly.

On April 30 there was still a tenderness over the left gluteal region but the urticarial reaction had almost disappeared. On May 10 the scrotum was infiltrated with procaine hydrochloride and the animal was castrated. It appeared normal at this time.

On May 17 the scrotum and sheath were markedly swollen. Drainage was established and exercise advised. Aqueous penicillin (3 million I.U.) was injected intramuscularly.

Two days later, the colt had again developed a urticarial reaction similar to that previously described. His temperature, pulse, and respiration were normal. Cortisone, 0.5 Gm., was given intramuscularly. Without further treatment, the lesions disappeared over a period of three to four days and no further attacks occurred.

Scratch tests of the skin on the neck applied in July, 1955, produced (*a*) no reaction with penicillin; (*b*) no reaction with metaphen®† (the disinfectant used), (*c*) a mild reaction in 24 hours with procaine, which disappeared within 48 hours.

The colt had been treated on Sept. 30, 1954, for a lacerated carpus at which time the area was anesthetized with a procaine solution. Procaine was also used on the horse on May 10, 1955.

Summary.—A yearling colt suffered an allergic reaction on two different occasions after the intramuscular injection of an aqueous suspension of penicillin G procaine. Scratch tests for procaine, penicillin, and the disinfectant used were inconclusive.

From the Department of Medicine and Surgery, Ontario Veterinary College, Guelph.

*Pyrahistine is a trademarked product of Pitman-Moore Co., Indianapolis, Ind.

†Metaphen is a trademarked product of Abbott Laboratories, North Chicago, Ill.

Hereditary Immunity of Calves to Aftosa.—In Italy, calves from cows immunized against foot-and-mouth disease during pregnancy had an effective immunity when 2 months old but none when 3 months old.—*Vet. Bull., Oct., 1955.*

Fluid Replacement in the Treatment of Dehydration from Diarrhea in the Horse

MICHAEL JASTREMSKI, D.V.M., and JOSEPH W. FERREBEE, M.D.

Cooperstown, New York

DEHYDRATION from intestinal loss of water and electrolyte, primarily sodium, chloride, and potassium, may assume critical proportions in the diarrheal diseases of animals. When the stage of seriously diminished blood volume and failing cardiac output is reached, it may be calculated that 25 to 30 per cent of the intracellular and extracellular fluid volumes have been lost.[1,2] Immediate replacement of a significant proportion of these losses is often mandatory if life is to be maintained. An example of the practicality and simplicity of this therapy is cited.

CASE HISTORY

The subject, a 5-year-old, 1,100-lb., Quarter Horse gelding, shipped in from the West, suffered from voluminous watery diarrhea of two days' duration; his temperature was 104 F. Two somewhat younger and less vigorous companions succumbed on arrival. By noon of the third day, the gelding's temperature had fallen to 96 F., diarrhea and urine output had ceased, and collapse appeared imminent. He stood quietly, swaying slightly, minding the flies not at all, head lowered, and heart sounds poor.

His jugular blood showed a hematocrit of 80 per cent, with only a few drops of liquid serum separable from 5 cc. of centrifuged clotted blood. Analysis of these drops by flame photometry revealed that the serum sodium concentration had fallen from a normal of around 140 to a level of 114 mEq. per liter, and the serum potassium concentration from a normal of around 4.4 mEq. per liter to 1.6. Not only had the body fluids been reduced in volume, as shown by the hematocrit, but the concentration of sodium and potassium in the remaining fluid was also far below normal levels.

DISCUSSION

Since dehydration of the above degree appears associated with a loss of 25 to 30 per cent of the body fluids,[1,2] a simple calculation of the approximate fluid and electrolyte deficit may be made. If it is assumed that a total body water content of approximately 70 per cent of the body weight is distributed between extracellular and intracellular compartments in approximately the ratio of 2:3, for a 500-kg. (1,100-lb.) horse, 350 liters of total body water (140 extracellular and 210 intracellular) would be approximate normal values. In the condition of dehydration above described, approximately 50 liters of extracellular fluid and 50 liters of intracellular fluid represent the loss.

The sodium chloride content of the 50 liters of extracellular fluid, at 8 Gm. per liter, would approximate a loss of 400 Gm. of sodium chloride. The potassium content, at 0.4 Gm. per liter, would approximate a 20-Gm. loss of potassium chloride. The loss of sodium from the remaining extracellular fluid, approximately 90 to 100 liters, is represented by the difference between the normal serum concentration of milliequivalents per liter (140) and the observed concentration (114), a difference of 26 mEq. per liter, which in a volume of approximately 100 liters would total 2,600 mEq. of sodium chloride. Since 1 Gm. molecular weight of sodium (or 60 Gm.) contains 1,000 mEq., the deficiency of sodium chloride in the remaining extracellular fluid would be approximately 150 Gm.

Similarly for potassium, where the normal value of 4.4 mEq. per liter had fallen to 1.6, a deficiency of 2.8 mEq. per liter, the deficit in 100 liters of remaining extracellular fluid would be about 280 mEq. of potassium. Since 1 Gm. molecular weight of potassium chloride (or 75 Gm.) contains 1,000 mEq. of potassium; one-quarter of this 280 mEq. (or about 18 Gm. of potassium chloride) represents the potassium deficiency of the remaining extracellular fluid.

With regard to the loss of 50 liters of intracellular fluid, calculation of the amounts of sodium and potassium lost with this fluid are less important. The loss of

From the Mary Imogene Bassett Hospital, Cooperstown, N.Y.

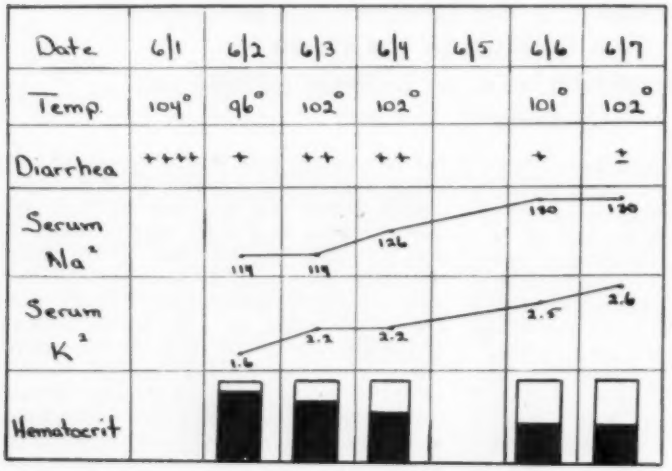


Chart 1—Clinical and laboratory response of a horse to the following fluid replacement therapy: on June 2, in the morning, 10 liters of fluid with 80 Gm. of NaCl and 35 Gm. of KCl, intravenously, and in the evening, 10 liters of fluid with 80 Gm. of NaCl, per os; on June 3, in the morning, 10 liters of fluid with 80 Gm. of NaCl and 35 Gm. of KCl, intravenously, and in the evening, 5 liters of fluid with 40 Gm. of NaCl and 20 Gm. of KCl, per os.

sodium in the 50 liters of intracellular fluid that has, as a rule, disappeared at this stage of dehydration is not great, probably not more than 10 mEq. per liter. The loss of potassium from this intracellular fluid may, however, be more than double this amount. However, its immediate and complete replacement is not necessary and it is probably sufficient for preliminary emergency treatment to restore no more than that amount of potassium that might be calculated to have been lost from the extracellular fluid alone. Further, the restoration of potassium to the intracellular fluid requires time and the recovery of cellular fluid volume and cellular nitrogen balance.

TREATMENT AND RESULTS

From the above calculations, it may be seen that a replacement of about 10 liters of water containing 80 Gm. of sodium chloride and 35 Gm. of potassium chloride is well within the range of the calculated deficit. An infusion of this amount of fluid and salt intravenously and the administration by mouth of a similar volume containing another 80 Gm. of sodium chloride (chart 1) resulted, in the course of 24 hours, in practically no change in serum sodium concentration, a slight but perhaps physiologically significant increase in potassium concentration, a measurable return toward normal of the hematocrit, and an improvement in blood volume and cardiac output that permitted a restoration of temperature toward normal. Clinical observation at the time of infusion of this small amount of fluid and salt revealed a marked improvement in the animal's well-being. Heart sounds became more normal, fluid and a little food were taken by mouth, intestinal peristalsis and mild diarrhea reappeared.

On the second day, an infusion of a similar amount of water, sodium chloride and potassium chloride caused a further return toward normal in the hematocrit, a significant increase in serum sodium concentration, but no change in serum potassium concentration, indicating in all probability a large degree of cellular utilization of the infused potassium. On the third day, another 40 Gm. of sodium chloride and 20 Gm. of potassium chloride, given in 5 liters of fluid by mouth, caused demonstrable return toward normal in both serum sodium and potassium concentrations and effected a restoration to normal of the blood hematocrit. By this time, with normal temperature and negligible diarrhea, recovery appeared assured and for a number of weeks a gradual restoration to full vigor was observed. In this longer interval, in all probability, full restoration of cellular potassium and nitrogen values and normal serum sodium, potassium, and water values occurred. It was, however, the acute restoration of part of this fluid and electrolyte deficit during the first two days of treatment that was of immediate lifesaving im-

portance in restoring circulatory blood volume and cardiac output.

It might be added that the cost of treatment was negligible. Solutions of sodium chloride, potassium chloride, and water were prepared from ordinary chemically pure laboratory or druggist supplies using a teaspoon as the unit of measure and ordinary laboratory distilled water as the solvent. Chemical cleanliness rather than sterility was relied upon as an acceptable cost-saving alternative in the preparation and administration of the intravenous solutions.

SUMMARY

A successful, efficient, and inexpensive example of fluid replacement in the treatment of near fatal dehydration from diarrhea in the horse is discussed and described.

References

[1]Darrow, D. C.: Body Fluid Physiology: The Role of Potassium in Clinical Disturbances of Body Water and Electrolytes. New England J. Med., *242*, (1950): 978.

[2]Darrow, D. C., Pratt, E. L., Flett, James, Jr., Gamble, Alice H., and Wiese, Hilda F.: Disturbances of Water and Electrolytes in Infantile Diarrhea. *Pediatrics*, *3*, (1949): 129.

Erythromycin for Actinomycosis

While penicillin, streptomycin, chlortetracycline (aureomycin®), and oxytetracycline (terramycin®) are each highly effective in actinomycosis (*Actinomyces israeli*) in man, each may produce toxic reactions. Erythromycin used in four human cases eliminated the infection in three and all but the involved bone in the fourth. The latter responded when enormous doses of penicillin were also given.—*Antibiotic Med., Sept., 1955.*

Arsenic Poisoning in Milk Cows

A number of cows in Britain became ill, showing normal or subnormal temperatures, depression, and diarrhea. One died the first day, 4 a few days later. Only cows fed in the milking parlor were affected. On the only necropsy, 24 hours after death, the carcass was significantly well preserved, lesions being confined chiefly to the digestive organs. The mucous membrane from the reticulum to the anus showed acute congestion with some hemorrhage, and the liver was congested and yellow. Bacteriological examinations were negative. Arsenic was present in the ingesta and liver. A metal drum of arsenical foot rot dressing was found to have developed a slow leak which dripped on some feed. The survivors stopped lactating and recovery was slow.—*Vet., Rec., Sept. 24, 1955.*

Congenital Johne's Disease in a Calf

In Ireland, where congenital infection had been suspected, an infected cow due to have her third calf was destroyed for laboratory examinations. Positive cultures were isolated from her typically affected bowel and mesenteric lymph nodes and from her apparently normal uterine mucosa. The ileocecal lymph nodes were larger than normal in her 8-month fetus but no acid-fast bacilli could be seen microscopically. However, *Mycobacterium johnei* was isolated by culture from the nodes and bowel mucous membrane of the fetus.—*Vet. Rec., Aug. 13, 1955.*

Swine Herds Free of Virus Pneumonia

At a bacon factory in Scotland, 5.8 per cent of the lungs of 670 old sows had pneumonia lesions while the rate in 1,000 young hogs was 55.4 per cent. This suggested that pneumonia-free herds might be developed by keeping only old sows and having them farrow and raise their pigs in isolation on clean ground. In practice, if any of the pigs in a litter show signs of virus pneumonia, gilts from that litter are kept for breeding purposes. When weaned, the gilts from disease-free litters are segregated until 4 months old when those selected for breeding are moved in with the pneumonia-free sows.—*Vet. Rec., July 9, 1955.*

Bovine Parasitism in the Southeast

In the past ten years there has been a greater change in parasitism of cattle in the southeastern states than in any other host, and probably than in any other area. The percentage with clinical parasitism was found at the Tifton (Ga.) Experiment Station to have increased from a negligible number prior to 1950 to 6 per cent in 1951, 11 per cent in 1952, and 17 per cent in 1953.—*W. S. Bailey, D.V.M., in Pub. Health Rep., Oct., 1955.*

Some Clinical Uses for *Rauwolfia Serpentina*

H. M. TABBUT, D.V.M.

Wellesley Hills, Massachusetts

Small animal practitioners are frequently consulted regarding the dog with an unreasoning and morbid fear of the noises such as thunder, cap pistols, and the backfiring of motors. The problem is one for which we have not had the perfect answer among the drugs commonly dispensed. The barbiturates, opiates, bromides, and synthetic sedatives all have side effects which limit their desirability.

Rauwolfia serpentina is an old drug which is being mentioned with increasing frequency.[1-3] It is a drug with tranquillizing properties which make it useful in dealing with a variety of human afflictions including certain cases of hypertension and some types of mental illness.

Because of its calming characteristics, its lack of depressant tendencies, its sustained effectiveness, and its apparent freedom from serious side effects, it seemed to offer promise in dealing with the "noise phobia." Our own pet, a Cocker Spaniel, is driven to distraction by these noises, but with *R. serpentina* in doses of 0.25 mg. (0.004 gr.) every eight hours, which was later reduced to 0.25 mg. every 12 to 24 hours, she was carried through the July 4 week-end emergency with a minimum of emotional harassment. She was not stupefied or incoordinate, nor was she tense and frightened. For other patients similarly troubled, I have now dispensed and prescribed this drug several times. One client came back for more, saying that the drug was the most effective treatment she had found for the control of her dog's fear of thunder.

Recent articles have mentioned the tendency of *R. serpentina* to produce diarrhea. In my limited observation, the side effect of this drug, in sedative dose, when continued day after day, was a tendency to fecal incontinence although the stool was formed. Another side effect is an increased prominence of the third eyelids, and a tendency toward myosis.

Dr. Tabbut is a small animal practitioner in Wellesley Hills, Mass.

Summary and Conclusions.—*Rauwolfia serpentina* was tried clinically as a calming agent for dogs upset by unusual noises. This drug offers promise and, in effective dosages, the side effects are not objectionable or troublesome.

References

[1]Connor, Nolen D., and Haas, Kenneth B.: Effects of Reserpine in the Dog. J.A.V.M.A., *126,* (1955): 137-140.

[2]Kahan, I. Howard: Accidental *Rauwolfia Serpentina* Poisoning in a Dog. J.A.V.M.A., *126,* (1955): 472.

[3]Anon.: *Rauwolfia Serpentina.* North Am. Vet., *36,* (1955): 559-560.

Piperazine in Bran Mash for Horses

It has been established that "piperazine adipate" is a useful anthelmintic in the control of internal parasites in the horse when the drug is administered by means of the stomach tube.

When 60 to 70 Gm. of this drug was mixed in a bran mash and given in a single feeding to each of 9 horses, the results compared favorably with its use via the stomach tube.—*Vet. Rec., Aug. 20, 1955.*

Penicillin for Equine Strangles

Many cases of equine strangles in Russia have been successfully treated with penicillin in recent years, the dose being 1,000 units per pound of body weight, subcutaneously or intramuscularly, twice daily. Exposed animals are given one dose daily for two or three days.—*A. H. Poliakov, veterinarian and director, All-Union Inst. Vet. Ectoparasitol., Mycol., and San., Moscow.*

Pencillin V, a New Oral Type

Penicillin V (phenoxymethyl penicillin), a new type of penicillin, is detectable in serum for at least four hours when 1 million units is given orally; the serum level is usually increased if probenecid (benemid) is given simultaneously. Two hours after three doses, at four-hour intervals, penicillin can be detected in pleural diffusions, in ascitic fluid, in thyroid tissue, and in considerable quantities in the bile, but not in cerebrospinal fluid when the meninges are normal. Preliminary clinical trials with penicillin V have been encouraging.—*Proc., Staff Meet., Mayo Clinic, Nov. 2, 1955.*

An Epithelial Ependymoma in an Ostrich

W. M. WILLIAMSON, D.V.M.; J. SIMON, D.V.M., Ph.D.; E. H. HATTON, M.D.

Brookfield, Illinois, and Madison, Wisconsin

No reference has been found to a previous report of an epithelial ependymoma in an ostrich. Therefore, the following report of such a lesion may be of interest.

CASE HISTORY

A male ostrich, 2 to 3 years old, was received at the Chicago Zoological Park at Brookfield, Ill., in August, 1954. The bird was in good health until Feb. 7, 1955, when a cream-colored, watery stool was passed. The wings were slightly drooped, the gait unsteady. Examination of the stool for parasites was negative. The condition progressed until, by February 9, the bird would make unsuccessful attempts to rise. The legs were extended and spastic; the neck was flaccid, and movements of the head were not under voluntary control. The palpebral conjunctiva was extremely edematous, bilaterally, but the pupils of the eyes appeared normal in size. The temperature was 98 F., and the pulse and respiration were normal. The following day blood, drawn for bacterial culture, was found to be sterile. In spite of antibiotic and intravenous fluid therapy, the bird died on February 11.

NECROPSY FINDINGS

Necropsy revealed catarrhal enteritis of the small intestine and a few petechial hemorrhages on the serosa of the intestine, myocardium, pancreas, and conjunctiva. Because male ostriches with similar symptoms had previously died at the zoo, Newcastle disease was suspected. The formalized brain and serum from the diseased bird, as well as from its female mate, were sent to the Department of Veterinary Science, University of Wisconsin, for study. Serum from neither of the animals neutralized Newcastle disease virus. An epithelial ependymoma of the brain was found.

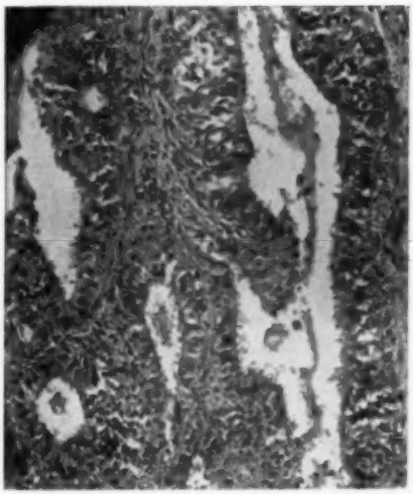


Fig. 1—Epithelial ependymoma from the brain of an ostrich, showing numerous epithelial structures resembling central canals. Hematoxylin and eosin stain; x 150.

The grayish colored tumor, situated superiorly on the brain at the junction of the cerebrum and cerebellum, was apparently attached to, or was a part of, a venous plexus. Grossly, it was a disclike growth with a smooth rounded edge, measuring 2

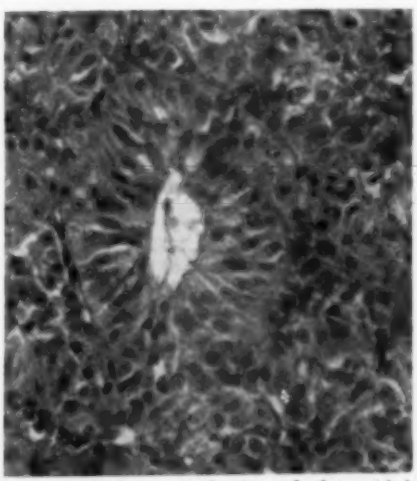


Fig. 2—A higher magnification of the epithelial ependymoma shown in figure 1. Hematoxylin and eosin stain; x 600.

From the Department of Veterinary Science, University of Wisconsin, Madison (Simon); veterinarian (Williamson) and consultant pathologist (Hatton) for the Chicago Zoological Park, Brookfield, Ill.

Published with the approval of the director of the Wisconsin Agricultural Experiment Station. Department of Veterinary Science publication No. 187.

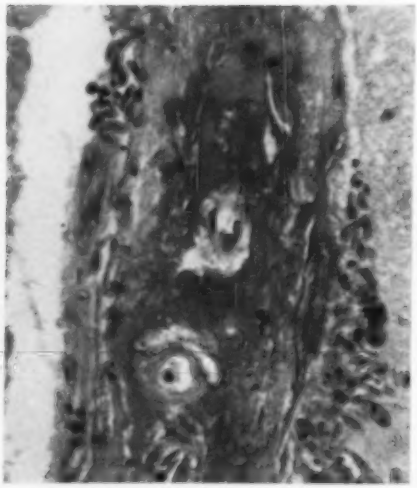


Fig. 3—Sclerosis and hyalinization of vessels in the cerebellum of the ostrich. x 600.

cm. in diameter and 6 mm. in thickness in the central (thickest) portion. No gross damage to the brain was evident.

MICROSCOPIC FINDINGS

Microscopically, the tumor tissue was composed of ependymal cells, blood vessels, and a slight amount of stroma. The ependymal cells were arranged in rosettes or were so grouped as to suggest early stages in the formation of such patterns (fig. 1, 2). That these cells might be blastlike is suggested by the large vesicular nuclei; they resembled normal ependymal cells. Changes which seemed unrelated to the tumor were detected microscopically in the cerebellum. These consisted of an area of encephalomalacia and hemorrhage involving the gray matter. In addition, there was sclerosis and hyalinization of nearly all of the larger blood vessels (fig. 3).

SUMMARY

A case of an epithelial ependymoma of the brain of a male ostrich is presented. Clinically, the signs resembled those of Newcastle disease. To our knowledge, this is the first case reported of such a lesion in an ostrich.

Phosphorus has been recognized as the key chemical for starting photosynthesis. It combines with nucleic acids and ribose sugars in the presence of certain enzymes and metallic ions.—*Sci. News Letter, Sept. 24, 1955.*

Nutria Fur Farming

The nutria (or coypu or South American swamp beaver) is easily raised in captivity, is not vicious, and can be made into a pet. These animals can be raised in conjunction with others such as mink for which their carcass, when pelted, can be used as feed. Their gestation period is approximately 128 days and they breed again within 48 hours, so it is possible to raise five litters of 4 to 10 young in two years. The young when born are hardy, active, and have their eyes open. The mammary glands of the dam are in rows on each side of the back so that the young can ride and nurse while their vegetarian mother is grazing in the water.—*Am. Fur Breed., Sept., 1955.*

Induced Erysipelas-Arthritis in Pigs

When 16 pigs were repeatedly injected intravenously with cultures of *Erysipelothrix rhusiopathiae*, no systemic signs were produced but all developed arthritis. Blood cultures were negative ten days after the last injection but cultures from the affected joints were positive up to 83 weeks.

On necropsy, gross changes were found in 97 of 308 joints examined (3 to 11 per animal), and 52 of the 110 joints cultured were positive. The joints affected, in the order of frequency, were: elbow, hip, hock, stifle, and knee. Although cultures from the regional lymph nodes were sometimes positive, there were few other lesions.—*Brit. Vet. J., May, 1955.*

Cows Sensitized to Tuberculosis

Four of 20 cattle in a herd in Michigan reacted to a tuberculin test. When slaughtered, none showed visible lesions. The owner was found to have active genitourinary tuberculosis and it is assumed that the cattle were exposed through poor personal hygiene. Cattle are relatively resistant to the human type of tuberculous infection but are readily sensitized.—*Pub. Health Service, Dec. 15, 1955.*

Radial Fracture Repair in a Heifer

PAUL E. HOFFMAN, D.V.M.

Athens, Georgia

The following case report is submitted not because of the rare occurrence of this condition but because of the fine recovery, considering the type of patient and the facilities which were available.

In the late afternoon of April 29, 1955, a valuable, 1,000-lb., 2-year-old, purebred Aberdeen Angus heifer was found in lateral recumbency in a pasture. She arose but was unable to support her weight with the left front leg which was swollen in the area of the carpus.

When examined the following morning, a simple transverse fracture of the radius was found 4 to 6 inches above the radiocarpal joint. Palpation revealed crepitation. A radiographic study was not possible.

Fig. 1—The cast on the Aberdeen Angus heifer as it appeared just before removal.

This heifer was walked to the shade of some nearby trees and anesthetized with 250 ml. of equithesin given intravenously. An additional 100 ml. was given by continuous drip to maintain surgical anesthesia.

She was then placed in lateral recumbency, small holes were bored through the horn of the toes of the fractured limb, and a 2-inch ring made in each hole with No. 7 galvanized wire. Traction was effected with a block and tackle attached to the wire toe loops and anchored to a farm jeep. However the traction moved the patient's body until a cotton rope was placed around the animal's chest and also anchored. The fracture was then reduced and traction maintained while a stockinette was placed over the leg from shoulder to toes. The leg was then wrapped with 3-by-3 plaster of paris bandages. Two dozen rolls of such plaster were used, the casting being made heaviest over the carpal joint and the area of the fracture. Cotton was used to pad the axillary region only.

After the cast began to harden, its medial and lateral sides were reinforced by strips of ½-inch plywood, 6 to 8 inches in width. The strips were secured by two mattress-like "stitches" of No. 7 galvanized wire passing through and through from one board to the other. One wire was anterior and the other posterior to the cast (fig. 1). The posterior lower wire was placed a little too tightly against the cast and later cut through, breaking the lower end of the cast but with inconsequential results.

The leg was kept under traction until the cast began to harden and the patient showed signs of recovering from the general anesthetic. The traction was then released and the patient rolled up on her sternum. Four hours later, the heifer was

Fig. 2—The appearance of the heifer's leg just after removal of the cast. A slight rotation of the foot is noticeable.

Dr. Hoffman is ambulatory clinician at the School of Veterinary Medicine, University of Georgia, Athens.

allowed to get to her feet which she did without difficulty. A temporary barbed wire lot was made to confine her to the vicinity of the shade trees. She soon learned to move with ease by throwing the leg forward in somewhat of a lateral arc.

When examined 12 days later, the heifer could move exceptionally well but the cast showed a beginning break over the carpus. A slight area of necrosis was detected in the axillary space.

Nine days later, the cast was found to be broken on the posterior surface of the fetlock joint, exposing the foot, and was noticeably looser than at the previous examination. The area of necrosis in the axillary space was no worse.

Thirty days after casting the leg, the heifer became frightened at the approach of visitors and jumped out of her enclosure, the only injury being more cracking of the cast.

Thirty-four days after application, the cast, which showed considerable damage, was removed. There was no necrosis beneath it. A callus was evident over the fracture site and the limb was in good alignment except for a slight lateral rotation of the foot (fig. 2). The heifer walked with only a slight lateral swinging of the leg, probably caused by the long period of walking in such a manner. She was confined to a box stall for a week, then allowed in an outside paddock. She made a satisfactory recovery and on July 16, 1955, delivered a normal calf.

Interesting features in this case included the toleration exhibited by this type of range animal: the apparent failure to lose weight; the failure to abort after the restraint, anxiety, and two-hour period of anesthesia; as well as the near-perfect alignment and healing of the fracture under such constant movement of the leg.

Adenocarcinoma of the Bovine Uterus

A study was made of 26 cases of adenocarcinomas of the uterus in cows in which the diagnosis was confirmed by gross and microscopic examination of tissues. Twenty-two of the uterine carcinomas had recorded lung metastases, 21 had lymph node metastases, and 14 had peritoneal metastases. A consistent, glandlike pattern of growth and secondary sclerotic changes appeared to be characteristic microscopic features of this tumor. Sixty-two cases of metastatic adenocarcinomas in cows, represented by at least lung metastases and regarded as probable uterine carcinomas, were compared with uterine carcinomas. The available lung, peritoneal, and lymph node lesions in these 62 cases were indistinguishable from metastatic lesions of known uterine carcinomas. The presence or absence of a primary carcinoma of the uterus could not be established definitely for any of these metastatic carcinomas because either a critical examination of the uterus had not been made or unsatisfactory tissue specimens had been forwarded for laboratory examination. The appearance and behavior of nine primary bovine lung tumors were also discussed and illustrated so that differentiation of that group of tumors from uterine carcinomas with lung metastases could be more easily made in ˊuture investigations.—*A. W. Monlux et al., Am. J. Vet. Res., (Jan., 1956) :45-73.*

Psittacosis Virus in Diseased Cattle

Adult cattle in Italy, with a highly infectious pneumoenteritis syndrome, showed a weak reaction to complement-fixation tests for psittacosis but their agglutination titers were up to 1:512. The disease was acute for eight to ten days but convalescence was often prolonged. Mortality was low.—*Vet. Bull., Oct., 1955.*

Aftosa Appears in England

Foot-and-mouth disease (aftosa), type O, was diagnosed on a farm near Coventry, England, on Nov. 24, 1955. When slaughtered, 11 cattle and 3 sheep of the 99 animals were affected. Because of possible exposure, all animals on five adjoining farms were also slaughtered. Movement of all animals within a radius of 10 miles was controlled. Infection probably originated from bones carried by a dog from a caravan site where meat of foreign origin had been delivered.—*Off. Internat. des Epizoot. Circ. 108, Dec. 14, 1955.*

Mites and Equine Encephalomyelitis

Laboratory and field studies in Texas indicate that while fowl mites may occasionally be infected with the virus, they play no essential role in the epizootiology of western equine encephalomyelitis.—*Vet. Bull., July, 1955.*

Role of Anemia in Vaccination Shock.—The vitamin E in alfalfa meal is poorly utilized by chickens, while the tocopherols in wheat middlings are well utilized.—*Proc. Am. Feed Mfr. A., May 25, 1955.*

Does Bracken Poisoning Kill Cattle?—Studies of cattle experimentally poisoned with bracken indicate that the primary effect is a thrombocytopenia with leukopenia developing relatively late. It is suggested that this leads chiefly to a chronic subclinical condition, which serves as a predisposing cause to other diseases.—*Vet. Rec., Oct. 2, 1955.*

Tocopherol Levels in Milk

For the purpose of obtaining additional information on the role of vitamin E (*alpha*-tocopherol) in the etiology of the muscular dystrophy occurring in beef calves in certain areas of Montana, colostrum and milk samples were obtained from Hereford cows on five ranches in an area where muscular dystrophy was prevalent. Some of these ranches had histories of severe losses from this disease, while others had no losses. Colostrum samples taken on the first, second, third, and fourth days, and milk samples taken on the eighth, twelfth, sixteenth, twentieth, twenty-fourth, twenty-eighth, and thirty-second days after parturition from 52 semirange Hereford cows in five herds were analyzed for their tocopherol content. Corresponding samples from 5 dairy cows were similarly analyzed. Averages of the tocopherol levels of the four colostrum samples from each beef cow varied from 18 to 1,537 μg./100 ml., or from 40 to 737 μg. per gram of fat. Averages of the tocopherol levels of the seven milk samples from each beef cow varied from 16 to 501 μg./100 ml., or from 45 to 275 μg. per gram of fat. Wide variations were observed in colostrum and milk tocopherol levels in the same herd, and from day to day in the same animal. Herd 2, with the lowest colostrum and milk tocopherol levels, was the herd which in previous years had suffered the greatest losses from muscular dystrophy, though no cases of this disease were observed during the two years of this study, 1953 and 1954. Colostrum and milk tocopherol levels from the 5 dairy cows were about the same as those of the beef cows, except for beef herd 2 which had much lower levels. Definite evidence for the role of tocopherol deficiency in the etiology of naturally occurring muscular dystrophy could not be drawn from this study.—*Karl F. Swingle et al., Am. J. Vet. Res., (Jan., 1956):28-35.*

Manganese Deficiency and Swine Bones

Swine fed a purified ration deficient in manganese (0.5 p.p.m.) from 3 weeks of age developed lameness, shortness of the forelegs and hindlegs, a thickening of the carpal and tarsal areas, a bowing of the front legs, and excessive obesity. After maturation, the osteodeformities remained but lameness disappeared. Radiographic and histological examination showed a retardation of osteogenesis in the growth discs of the radiuses, but the ulnas continued to grow so that bowed forelegs resulted. Lesions similar to the localized form of osteitis fibrosa were observed in the distal diaphysis of the ulnas at 110 and 125 days but not at 335 days. Neo-osteoid extensions proximal to the growth discs and adjacent to the aplastic lesions were present. The lipotropic action of manganese was evident by the excessive obesity and increased bone fat in the deficient animals.—*G. M. Neher et al., Am. J. Vet. Res., (Jan., 1956):121-128.*

Stilbestrol in Fattening Bulls

When young bulls (400 to 675 lb.) were given stilbestrol implants (84 mg.) at the Ohio Agricultural Experiment Station, the increase in rate of gain was significant but less so than in steers. It caused some retardation in sexual development, with less masculine head and crest, some depression in growth of testes, and some stimulation of teat development and elevation of tailhead. In regular drylot fattening, bulls gained more economically and faster than steers, but there was no advantage in feeding them as bulls for a period and then castrating and finishing them as steers.—*J. Anim. Sci., Nov., 1955.*

Growth Standards for Dairy Cows.—On page 514 in the December, 1955, JOURNAL under the title, "New Growth Standards for Dairy Cows," 39.6 lb. was given as the present average weight of Holstein-Friesian females at birth. It should have read *93.6 lb.*

Editorial

Established and New Uses for Antibiotics

During the decade in which antibiotics have been available for use or investigation with domestic animals, volumes of reports have accumulated. Attempts to summarize their values, however, still find many varying and sometimes sharply conflicting opinions.

Therapeutic Uses

Veterinary practitioners have been chiefly concerned with the therapeutic values of the various antibiotics for specific animal diseases. Since available antibiotics are effective chiefly against bacteria, and since many of the serious animal diseases are caused by viruses or other nonbacterial organisms, the value of antibiotics as specifics is quite limited in veterinary medicine.

The response to penicillin of such septicemic diseases as acute erysipelas, blackleg, and anthrax is remarkable. Along with the apparently specific effect of some antibiotics on chronic infections, such as that of streptomycin on true actinomycosis, these responses have changed our attitude about new drugs from the skepticism which existed, prior to the introduction of the sulfonamides, to one sometimes bordering on gullibility.

Definite benefits have resulted from the administration of various antibiotics for mastitis, shipping fever, pneumonia, so-called foot rot, navel ill, and other diseases which may be due to varying or multiple infections. With these, the drug action may be considered as less specific.

When the opinions of practitioners differ as to the value of an antibiotic for a certain disease, it may be that apparent benefits from its use were coincidental to the animal's recovery or that the effect was on secondary infections, which do vary. The benefits from the use of certain antibiotics in diseases, such as canine distemper and feline panleukopenia, can be due only to their affect on secondary invaders. This may also explain why streptomycin has been so remarkably effective and penicillin so ineffective against shipping fever for some veterinarians, while others report just the reverse.

In the above instances, the antibiotics have usually been administered to the patients individually. Some antibiotics also have proved valuable for group therapy when given in the feed or drinking water, such as often is done for enteric infections in swine, or for several poultry diseases. Some (the tetracyclines or neomycin) are effectively used, *per os*, to reduce the level of potentially pathogenic agents prior to surgery on the intestines. However, in man antibiotics are reported to be less safe and satisfactory than certain sulfonamides for "sterilizing the gut."

Antibiotics have value in many other surgical procedures, including wound treatment, but they should never be substituted for asepsis.

In other phases of veterinary endeavor, such as controlling bacterial contamination of semen used for artificial insemination, or of tissue extracts in transference or inoculation of nonbacterial agents, antibiotics also have great value.

Growth Stimulants

In recent years, antibiotics have been used extensively in the field of domestic animal nutrition. Both research and field use have established their remarkable value for growth stimulation and feeding economy for swine, for poultry except ducks and geese, and for young calves. With sheep, horses, and dogs, their use has been limited but encouraging. In all species, the benefits are most evident in younger animals but for swine, chickens, and turkeys, results indicate that antibiotics can be economically fed until the animals attain the usual market age. Carcass quality is affected little if at all and any benefits to reproduction are apparently due to improved health or earlier maturity.

There is considerable speculation as to the mode of action of antibiotics in nutrition. Because of their known effect on microorganisms, study has been centered on the flora of the alimentary tract. The consensus is that antibiotics suppress organisms that are detrimental to health. This is shown by a reduction in the percentage of unthrifty animals and by the decreasing benefit of the drug as sanitary conditions are improved. They may also suppress organisms which compete with the animal host for nutritive elements and they may encourage beneficial organisms such as those which synthesize vitamins. It is also suggested that antibiotics somehow affect

the wall of the intestine (possibly because of reduced irritation) so that absorption is facilitated by what is described as "a thinning" of the mucosa.

It will be interesting to see how well the latter theory is supported when more histological studies have been made.

It is also suggested that the intestinal motility is reduced (again possibly because of less irritation), thus allowing more time for digestion and absorption of the nutrients. Antibiotics may also reduce the dietary requirement for nutritive elements such as complex carbohydrates, proteins, vitamins, and perhaps minerals. Hormone activity may also be affected.

The mode of action doubtless varies with the species, the environment, the rations and with the antibiotics fed.

FOOD PRESERVATION

At present there is considerable interest in the use of antibiotics to aid in the preservation of foods. As with previous uses, this is being carefully studied by the Food and Drug Administration. To date they have approved this use of antibiotics only for poultry processing, using 10 p.p.m. of certain antibiotics in the water which is frozen to make "slush ice" for chilling the unfrozen poultry. This was approved when it was found that the antibiotic, in such concentrations, was destroyed in cooking. A similar use on fishing vessels seems to preserve fish and shell fish much longer than plain ice does.

Other uses being studied by the food industry are: preventing spoilage of meats by injecting the antibiotic solution just before or just after the animal is slaughtered; adding 1 p.p.m. to milk, thus retarding spoilage without refrigeration for about 24 hours; and spraying on fresh vegetables to be used for display at markets or in fresh salad preparations. Also, treated ice could be used in ice water for drinking purposes and treated ingredients in making custards and other such foods which frequently are involved in food poisoning.

Antibiotics are also being increasingly used as a spray for the control of diseases of growing plants.

While these and many other possible uses would result in great saving of foods they may also encourage carelessness in the handling of same. As with asepsis, dependence on antibiotics must never be substituted for sanitation.

WARNINGS FOR USAGE IN ANIMALS

Except for the indigestion which results, especially in ruminants, from the prolonged oral use of antibiotics (or sulfonamides), as well as occasional mycosis, little has been reported on the danger to animals from their use. However, in man, deaths have occurred from shock when sensitivity to an antibiotic has developed, or from aplastic anemia, especially after the use of chloramphenicol (chloromycetin®) in children. Dysentery, especially with oral use of the tetracyclines, and mycosis, particularly of the body openings, due to restraint of bacteria which are antagonistic to fungi, are frequently reported. The threat of pathogenic organisms developing resistant strains as a result of prolonged use of an antibiotic must be considered.

Genetic injury, such as could result from the failure to eliminate breeding animals which have inferior inheritable qualities when their health and growth have been stimulated by the constant use of drugs, is a possibility that should be kept in mind. The question is: Could this interference with the basic evolutionary principle of survival of the fittest be of significance?

Anyhow, apparently all the "wonder" has not yet worn off these "wonder drugs."

Obedience Training of Dogs Should Be Encouraged

All things that are of benefit to the animal kingdom should be of interest to veterinarians. In recent years, people interested in dogs have attempted to improve them as pets and companions by the use of discipline or obedience training. Obedience training schools in many areas have been developed where the novice can take his dog for instruction in canine etiquette. An owner with a well-disciplined dog, especially one he has trained himself, is a happy, enthusiastic owner.

The pet owner who has a genuine interest in the welfare of his dogs is usually the most satisfactory client to work with. Obedience training is an activity that would reflect favorably in creating this interest.

In this issue of the JOURNAL there is a book review on obedience training. Films on obedience training are also available (*see* Jan. 15 JOURNAL, p. 105) for showing to interested groups.—W. H. RISER.

Current Literature

ABSTRACTS

Laboratory Techniques for Isolation and Propagation of Vibrio from Cattle

Nutrient agar enriched with 10 per cent defibrinated cow blood was used to isolate Vibrio organisms from the reproductive tracts of cattle. Vibrio was isolated most frequently from vaginal mucus, semen, and preputial samples. In the cultural isolation of the organism, the authors' most reliable means of diagnosing vibriosis, two types of Vibrio were commonly found. All bacterial growth resembling the two types was examined under oil immersion. A satisfactory stain was developed for use with the standard microscope. This stain allowed motile bacteria to remain active for several minutes and consisted of 0.16 per cent methylene blue, 0.03 per cent crystal violet, 0.06 per cent ammonium oxalate, 1.6 per cent ethyl alcohol, 38.0 per cent distilled water, and 60.0 per cent physiological saline solution.—[*J. H. Bryner and A. H. Frank: Laboratory Techniques for Isolation and Propagation of Vibrio from Cattle. Am. J. Vet. Res., 16, (Oct., 1955): 634-635.*]

Reproductive Efficiency of Heifers with Vibrio Fetus

Infection, as shown by clinical evidence and the presence of agglutinins in the blood serum or cervicovaginal mucus or both, followed cervical exposure of 4 of 4 heifers, vulval exposure of 2 of 4 heifers, and contact exposure of 2 of 2 heifers plus 1 of the 4 heifers that failed to develop serological evidence of vibriosis following vulval exposure. Recovery, as indicated by conception and followed by a normal gestation and a decline in serum and cervicovaginal mucus titers, occurred within a period of eight to 14 months in 5 of 8 heifers. The interval required for the development of significant levels of agglutinins in the blood and cervicovaginal mucus following cervical exposure was four to 12 weeks. The appearance of agglutinins in the blood serum was independent of agglutinin formation in the cervicovaginal mucosa and vice versa. For this reason, both blood serum and cervicovaginal mucus should be tested for agglutinins in diagnosing vibriosis.—[*W. N. Plastridge, H. L. Easterbrooks, L. F. Williams, E. M. Kiggins, and E. Walker: Reproductive Efficiency and Serological Findings in Heifers Experimentally Infected with Vibrio Fetus. Am. J. Vet. Res., 16, (Oct., 1955): 493-498.*]

Catarrhal Enteritis of Chicks Similar to Bluecomb Disease

A catarrhal enteritis of chickens resembling bluecomb disease was readily transmitted through 15 serial passages in the day-old chick by the oral administration of suspensions of infective intestines. The infected chicks developed a catarrhal enteritis as well as characteristic depression of temperature and growth rate. Mortality ranged from 37 to 95 per cent with an average of 67 per cent during an experimental period of 12 days. Certain antibiotics reduced the mortality and infected chicks gained weight even though only slightly. Unlike bluecomb disease in turkeys, which appeared to be species specific, the disease of chicken origin seemed to affect poults as easily as chicks.—[*J. McN. Sieburth and B. S. Pomeroy: Experimental Transmission of a Catarrhal Enteritis of Chicks Similar to Bluecomb Disease. Am. J. Vet. Res., 17, (Jan., 1956): 24-27.*]

Evaluation of Fermentative Capacity of Erysipelothrix Rhusiopathiae

Twenty strains of *Erysipelothrix rhusiopathiae* were assayed for their fermentative capacity, using a newly designed basal medium. Compounds to be evaluated were added to this basal medium which consists of: bacto-tryptose, 20.0 Gm.; bacto-peptone, 5.0 Gm.; bacto-beef extract, 3.0 Gm.; sodium chloride, 5.0 Gm.; thiamine hydrochloride, 0.005 Gm.; and distilled water to 1 liter. Bacto phenol red indicator was added to make a final concentration of 0.01 per cent. The pH was adjusted to 7.6. Each component of the basal medium was individually tested for its ability to support a fermentation reaction. In general, the 20 strains were found to consistently attack glucose, fructose, lactose, galactose, mannose, xylose, and arabinose with the production of varying degrees of acid and no gas. Sucrose, salacin, rhamnose, maltose, dextrin, sorbitol, inositol, esculin, and mannitol were not affected. A difference in rate of fermentation was observed which appeared to be independent of the rate of growth. This was most clearly demonstrated between the rough and smooth strains, the rough being slower to ferment the test compounds, though of a similar rate of growth as the smooth strains. After 6 months' storage in a refrigerator, no perceptible alterations were detected in this basal medium.—[*Loyd W. Tiffany: A Suitable Basal Medium for Evaluation of the Fermentative Capacity of Erysipelothrix Rhusiopathiae. Am. J. Vet. Res., 16, (Oct., 1955): 636-637.*]

Equine Infectious Anemia Epizootic in Mexico

A study of an outbreak of a disease in race horses that had been diagnosed as babesiasis, or anaplasmosis, or both revealed two types of conditions: one characterized by intermittent periods of fever; the other by marked, watery, nonfetid diarrhea. No parasites were found in Giemsa-stained, blood-smear preparations from any of the horses. No gastrointestinal parasites were found. Blood and fecal cultures were negative. Tuberculin tests on 5 horses with diarrhea were also negative. The symptomatology and pathology, the unsanitary environment, and the use of the "common syringe" pointed to equine infectious anemia

as an alternative diagnosis. This diagnosis was confirmed by the transmission of the disease to horses with blood from horses with fever and those with diarrhea, and also with a mixture of Seitz-filtered plasma from both. Donkeys injected with whole blood and with filtered plasma from both groups of horses were unaffected. Young pigs similarly injected developed purpuric spots and swollen, wobbly, paralyzed hindlegs in four to six days; a control pig injected with blood from 2 normal horses remained unaffected. The complement-fixation test of Altara, Serra, and Guarini gave positive reactions with 57 per cent of the serums tested, doubtful with 19 per cent, and negative with 24 per cent.—[*M. Scherago, G. Varela, and A. S. Hofer: An Epizootic of Equine Infections Anemia in Race Horses in Mexico. Am. J. Vet. Res., 17, (Jan., 1956): 109-116.*]

Isolation Equipment for Newborn Pigs

Inexpensive animal isolation equipment which has been used successfully in the study of transmissible gastroenteritis in pigs and in raising pigs deprived of colostrum is described. The units are made of commercially available galvanized iron cans, afford good visibility of test animals, a convenient means of feeding with a minimal danger of cross infection, and are easily cleaned and sterilized.—[*Edward O. Haelterman: Practical Isolation Equipment for Baby Pigs. Am. J. Vet. Res., 17, (Jan., 1956): 129-131.*]

Encephalitis in Dogs Produced by Distemper Virus

An agent, designated as "Snyder Hill," from a dog showing signs of generalized distemper infection only, has been transferred in series by intracerebral inoculation into other dogs. This agent was identified with distemper virus by cross-immunity and neutralization tests with established distemper strains. Thus far, 35 serial intracerebral transfers have been made. In initial passages, some inoculated dogs developed epileptiform convulsions after more than 22 days. Beginning with the fifth passage and in all subsequent transfers, neurological signs have appeared regularly six to 16 days after inoculation. Histological studies of affected dogs showed an encephalitis. Perivascular cuffing, nonsuppurative leptomeningitis with variable accumulations of mononuclear cells, and neuronal degeneration were the principal changes found in dogs that showed nervous signs after the shorter incubation periods. In 2 dogs that showed nervous manifestations after 22 and 29 days, there was also demyelination as evidenced by vacuoles and gitter cells in the white matter of the cerebellum and inclusion bodies in glial cells. After the fourth passage, all except 1 dog inoculated intracerebrally with adapted virus showed epileptiform convulsions or died without observed neurological signs. Only a fourth of the dogs that were inoculated by other routes showed these signs. Apparently a form of distemper virus has been procured, and a method of inoculation found, that would regularly produce encephalitis in dogs. Dogs recovered from the generalized form of distemper induced by the Snyder Hill strain or by an attenuated egg strain were fully immune to intracerebral inoculations with the Snyder Hill strain.—[*James H. Gillespie and Charles Richard: Encephalitis in Dogs Produced by Distemper Virus. Am. J. Vet. Res., 17, (Jan., 1956): 103-108.*]

Bacterial Permeation of the Gut Wall in Irradiated Burros

Bacterial invasion from the gut was observed in burros irradiated until death at rates of 25, 100, and 400 r per day. After irradiation of 25 r per day, microorganisms commonly present in the intestine of the burro were found in the blood and internal organs. These organisms were primarily Proteus and aerobic sporeformers and, to a lesser extent, coliform, Pseudomonas, and Alcaligenes organisms and a Streptomyces resembling *Streptomyces coelicolor. Serratia marcescens,* used as a tracer organism, was inoculated into the cecums of burros irradiated at 100 r and 400 r per day. At death, the tracer organism was recovered from the blood and internal organs of burros irradiated at 100 r per day and was observed to pass through an *in vitro* preparation of the excised gut. *In vivo* and *in vitro* studies indicated changes in the intestinal walls of burros irradiated at 400 r per day were not sufficient to permit microorganisms to pass in great numbers.—[*C. J. Mayhew, U. S. G. Kuhn, III, J. H. Rust, B. F. Trum, and J. M. Woodward: Bacterial Permeation of the Gut Wall in Irradiated Burros. Am. J. Vet. Res., 16, (Oct., 1955): 525-528.*]

Growth Characteristics of Foot-and-Mouth Disease Virus

Foot-and-mouth disease virus (type O, Holland strain) multiplies in large-scale tissue cultures in a stepwise manner. Whole culture titrations revealed the first detectable virus increase at about the fourth hour of incubation. Further increases occurred until the peak was reached at variable times between the sixteenth and twenty-second hours with a mean of 19.2 hours. The rapidity with which the peak was reached was proportionate to the size of the inoculating dose. Lesser increases occurred after the peak of growth. Increases were never detected after the thirty-eighth hour. Titrations of immunizing capacity indicated this to increase far beyond the peak period of infectivity. Complement-fixing titers roughly followed those of infectivity, their peaks generally coinciding. However, the relationship was variable thereafter, the complement-fixing titer sometimes

continuing to rise, other times gradually decreasing. A continuous relationship between complement-fixing and immunizing antigen thus appears to be questionable.—[*H. S. Frenkel and William E. Ribelin: Cultivation of the Foot-and-Mouth Disease Virus in Explanted Epithelim of the Bovine Tongue. IX. Growth Characteristics of the Virus in Large-Scale Tissue Cultures. Am. J. Vet. Res., 17, (Jan., 1956): 40-44.*]

Effect of Antibiotics on Intestinal Sections of Rabbits and Swine

The effects of procaine hydrochloride and antibiotic preparations (chlortetracycline, procaine penicillin, potassium penicillin, dihydrostreptomycin, and bacitracin) upon the motility of isolated rabbit and swine intestinal sections have been investigated. Procaine penicillin and procaine hydrochloride decreased the amplitude of rhythmic contractions and, at high concentrations, decreased the motility and relaxed the muscle. These two preparations appeared to have a cumulative effect on the motility of the rabbit muscle. Potassium penicillin had little effect upon motility except for the production of slight transient contractions. Penicillin independent of procaine or potassium apparently does not affect the motility of rabbit or swine isolated intestinal muscle. Chlortetracycline was not as effective in decreasing motility as was procaine penicillin, but it had a greater effect than did the potassium penicillin. Chlortetracycline decreased the amplitude of the rhythmic contractions and inhibited the motility of rabbit muscle. It had a varied effect upon swine muscle motility but, in general, decreased amplitude of contractions followed by inhibition of motility. Dihydrostreptomycin decreased the amplitude of contraction, inhibited motility, and relaxed swine muscle. Bacitracin appeared to have negligible effects upon isolated muscle. Swine muscle and rabbit muscle differed in their response to antibiotic preparations. In general, higher concentrations of the preparations were required to produce responses by the rabbit muscle similar to those produced by swine muscle.—[*Elwood F. Reber: The Effect of Antibiotics upon the Motility of Isolated Intestinal Sections of Rabbits and Swine. Am. J. Vet. Res., 16, (Oct., 1955): 553-557.*]

FOREIGN ABSTRACTS

Cultivation of Herpes Virus in Tissue Culture

Herpes virus is readily cultivated in tissue culture using trypsinized rabbit kidney tissue as the base. If the culture flasks or tubes are first coated with "formvar," the cellular plaque is established more rapidly and becomes more dense. Specific cytopathological lesions are rapidly developed.

Rabbit kidney cells are a better medium for Herpes virus than kidney cells obtained from monkeys, man, or chicken embryo cells, and also than embryonating eggs or intracerebrally inoculated mice.—[*G. Barski, M. Lamy, and P. Lepine: Tissue Culture in Trypsinized Rabbit Kidney Cells and Its Application to the Study of Herpes Group Viruses. Ann. Inst. Pasteur (Paris), 89, (1955): 415-427.*]—J.P.S.

Innervation of the Equine Heart

Only a few studies of the innervation of the heart of the horse have been published. The authors trace in detail all the fibers from the central and sympathetic systems and their distribution in the heart and give a description of the ganglionic system of the heart. Three detailed plates are included.—[*R. Barone, and F. Valentin: The Innervation of the Heart in the Horse. Rec. med. vet. (Alfort), 131, (1955): 727-742.*]—J.P.S.

Xenodiagnosis of Rubarth's Disease

Diagnosis of contagious hepatitis in the sick dog is difficult. The diagnosis may be suggested by clinical symptoms but certain laboratory studies are helpful:

1) The blood picture — leukopenia of all white blood cells is especially marked after the sixth day.

2) Complement-fixation, using suspected blood as antigen, is positive after the seventh day.

3) Isolation of virus by inoculation — (*a*) young dogs, foxes, and coyotes are susceptible; ferrets are resistant; (*b*) growth of virus in embryonating eggs; (*c*) growth of virus in tissue culture.

4) Mice inoculated with blood or urine from infected dogs develope antibodies which will show positive complement-fixation reactions. The virus is usually present in the blood and urine just prior to the increase in temperature which is the sign of viremia. The blood remains positive for about four days.

Diagnosis is not difficult in dogs which have died of the acute form of the disease. There are lesions of the liver, "perihepatitis," and thickening of the small intestine and gallbladder. Typical inclusion bodies occur in liver cells. Complement-fixation can be done using liver as antigen.

In an experimental dog, temperature reactions occurred on the third day. Virus was present in the blood on the third to sixth days as demonstrated by production of antibodies in mice. Complement-fixation, using blood antigen, was positive from the fifth day.—[*L. A. Martin and B. Delage: Xenodiagnosis of Rubarth Disease Using Mice as Intermediary. Bull. Acad. vét. France, 28, (1955): 233-238.*]—J.P.S.

Irrigation of the Nasolacrimal Duct in the Ox

Irrigation of the nasolacrimal duct is usually considered impractical in the ox because of the concealment of the nasal orifice of the duct on the ventromedial surface of the tip of the ventral turbinate. The author wished to flush the duct

and the conjunctival sac to remove eye worms (Thelazia spp.). He found that, by everting the lateral margin of the nostril, he could easily expose the orifice. A teat cannula attached by a rubber tube to a syringe was used for irrigation.—[*G. V. Gusakov, Moscow Veterinary Academy: Irrigation of the Nasolacrimal Duct in Cattle. Veterinariya, 32, (Aug., 1955): 66-68.*]—R.E.H.

[Submitted with a red face on Dec. 3, 1955. I have two laboratory guides in anatomy that state that the orifice is not accessible clinically. Since reading this, I have looked at a cow and found that this orifice is readily accessible.—R.E.H.]

Intramuscular Carbon Tetrachloride in Fascioliasis of Sheep

The subcutaneous injection of carbon tetrachloride, as recommended by Demidov (abstr. *J.A.V.M.A., 126,* (1955): 238), while tolerated by adult sheep, was fatal in 3 of 10 yearlings. The authors found that carbon tetrachloride mixed with an equal amount of petroleum jelly and injected intramuscularly did not produce the undesirable reactions of intraruminal or subcutaneous administration. In a controlled experiment with 20 sheep examined at necropsy, the safe and effective intramuscular dose was 3 cc. of carbon tetrachloride for an adult sheep and 2 cc. for a yearling. In a field trial, 96 sheep, shown by fecal examination to be infested, were treated by this method. Ten days later, fecal examinations revealed one fluke egg in the flock.—[*B. N. Kazakov and V. A. Zotov, Moscow Veterinary Academy: The Intramuscular Use of Carbon Tetrachloride in Fascioliasis of Sheep. Veterinariya, 32, (Aug., 1955): 50-52.*]—R.E.H.

Foot-and-Mouth Disease Vaccine

Countries in which control of foot-and-mouth disease is based on extensive vaccination, e.g. Germany, Belgium, France, and Italy, continue to have considerable losses due to this disease. In countries such as Great Britain, Sweden, Switzerland, Canada, the Netherlands, and Denmark, where stamping-out and strict control methods are used, the disease, usually traced to introductions from enzootic areas, is kept at a minimum.

Control of the antigenicity and safety of foot-and-mouth vaccine is important.

In Denmark, some vaccines held in cold storage for 12 to 18 months caused the development of foot-and-mouth disease two to eight weeks later, or after a prolonged incubation.

Michelson C. (*Bull. Off. Int. des Epizoot,* 1951: 644) suggests that live virus became eleuted from the aluminum hydroxide adjuvant. In the production of anavirus, it is important to treat the virus suspension with formalin and suitable heat before the addition of adjuvants.

In testing the vaccine for safety, at least three times the normal dose should be given subcutaneously to susceptible calves and multiple intralingual doses should be injected in the same calf. Tests on 10 guinea pigs should also be made. If the vaccine is held for six months or longer, a second safety test should be made. It is also suggested that tetanus anatoxin should be retested if held for long periods before use. In the case of tetanus anatoxins, intracranial injections are suggested. Safety test animals should be observed for several weeks to determine the presence of delayed incubation.—[*G. Ramon: Foot-and-Mouth Disease. Bull. Off. Internat. Epizoot., 43, (1955): 900-932.*]—J.P.S.

The Value of Semen Freezing

The use of frozen semen is a technical success of high significance. In Spain, semen has been withdrawn from the tail of the epididymis of the best fighting bulls, immediately after slaughter, and kept in a deep frozen condition until the mating time, which is seasonal.

In Italy, the staff at the "Lazzaro Spallanzani" Institute have been concerned with the deep-freezing method for some years, obtaining results that were not always gratifying. It should be borne in mind, however, that the equipment available was poor. An experimental shipment of deep-frozen semen to Asmara and Addis Ababa was made in December, 1954, with satisfactory results. It shows that the necessary requirements could be met, the lack of dry ice being overcome by the immediate production of solid carbon dioxide by using common gas cylinders.

However, months and even years are needed before this new method can be considered complete from a technical and practical point of view. —[*Prof. T. Bonadonna, Instituto Sperimentale Italiano "L. Spallanzani". Congelamento del Materiale Spermatico Nella Pratica. Zootech. e vet., 3, (March, 1955): 1-17.*]—ANTHONY SUNARA.

BOOKS AND REPORTS

Obedience Training for Your Dog

This is a worthwhile inexpensive manual which presents the subject of canine obedience training in a condensed, clearly illustrated manner. It is especially useful for the novice. Veterinarians are often asked where to obtain information regarding teaching obedience to a dog. This book can be recommended for its clarity, inclusiveness, and completeness of instruction.—[*Obedience Training for Your Dog. By Cecil Wimburst. Illustrated. 68 pages. Paper cover. Dover Publications, Inc., New York, N. Y. Price 65 cents.*]

Classics of Biology

This translation of a Spanish text is a survey of the progress in the study of biology in different ages up to the present. Its 16 chapters discuss subjects such as matter and energy in life; cell theory; sexual and asexual reproduction; heredity; geography and palaeontology; and reflexes, conscious-

ness, and will. There are no figures.—[*Classics of Biology. by August Pi Suner. 337 pages. Philosophical Library, Inc., 15 East 40th St., New York 16, N. Y. 1955. Price $7.50.*]—W.A.A.

Synopsis of Medicine

Since the first edition in 1920, the aim of this text has been to provide a synopsis of the important principles of medicine. The diseases are classified, their symptoms explained, and the pathology and reference to the probable theories are given. It contains 1,253 pages, 5.0 by 7.5 inches—all in fine print.—[*Synopsis of Medicine. By Sir Henry Letheby Tidy. The Williams and Wilkins Co., Baltimore, Md. 1954. Price $7.50.*]—W.A.A.

The Body Fluids

The subtitle for this new book, "Basic Physiology and Practical Therapeutics," gives an insight into the intent of the authors. It is their purpose to provide the physician with the information necessary to recognize, assess, understand, and treat patients in which there are disorders of the body fluids. This area of medicine, both human and veterinary, has not been adequately comprehended in the past but this book should be of assistance in bringing it up to date.

Part I covers the basic physiology of the body fluids, including their origin, distribution, function, and regulation. The concept of a "dynamic steady state" is presented as essential in understanding the body fluids; this concept states that, in spite of a continuous turnover of many of the constituents, a constant composition of the body fluids is maintained in health.

Part II discusses the regulatory mechanisms in health and the disturbances which result from disease. It includes the normal values in health; the mechanisms guarding these values; conditions leading to, and treatments for, deficits or excesses; and disturbances in acid-base balance and pH with their treatment. Included also is a glossary of chemical terms applied to acid-base balance and to pH.

Part III covers disease entities accompanied by changes in the body fluids. These include renal disease, congestive heart failure, and pathological changes in certain endocrine organs (anterior pituitary, thyroid, gonads, pancreas, posterior pituitary and, especially, the adrenal cortex). The discussion of body fluid disturbances in children should be of use to veterinarians in their contacts with young animals. The chapter on the special fluid problems of the surgical patient will prove most informative to the surgeon who wants to know what changes to expect from uncomplicated surgery and what to do about complications.

Part IV discusses the diagnosis of specific abnormalities of certain body fluid constituents, the range of requirement of these constituents, the estimation of replacement needs, and the techniques and solutions used in replacement therapy.

The contents of this book are exceptionally well organized; common denominators or relationships are constantly emphasized. For example, it shows that such problems as starvation, dehydration, renal insufficiency, and congestive failure occur in surgical patients as well as in medical patients.

This book is recommended to physiology students and to veterinary practitioners in the belief that it will add greatly to their understanding of the body fluids.—[*The Body Fluids. By J. R. Elkinton and T. S. Danowski. 1st ed. 626 pages. The Williams and Wilkins Company, Baltimore, Md. 1955. Price $10.00.*]—CLYDE F. CAIRY.

Turkey Management

This sixth edition of this self-styled "encyclopedia of facts for turkey producers" covers everything from hatching to marketing. The well-illustrated chapters are arranged in the order that the problems would confront the producer. The chapters on disease prevention and sanitation (17 pages) and on diagnosis and control of diseases and parasites (70 pages) are well written and give much sound advice including the importance of laboratory diagnoses and veterinary service. The discussions of diseases are quite up to date and accurate; however, some may feel that too much is given on treatment. It should be on the book shelf of all who work with turkeys.—[*Turkey Management. By Stanley J. Marsden and J. Holmes Martin. 999 pages. The Interstate, Danville, Ill. 1955. Price $7.00*]—W.A.A.

Regional and Applied Anatomy of the Domestic Animal

This book, featuring selected parts of the head and neck, is the first of a series portraying the anatomy of clinically important areas of several species of animals. It has 104 well-labeled illustrations, many of which are drawings of partially dissected specimens. They are presented in a unique but effective manner.—[*Regional and Applied Anatomy of the Domestic Animals. Part I. Head and Neck. By John A. Taylor. 170 pages. 104 illustrations. Oliver and Boyd, Edinburgh, Scotland. 1955. Price 25 shillings.*]—W.A.A.

Finches

This handy-sized book is well-written and well-illustrated by a world traveler who is now a resident of Australia. The author, a breeder of birds, has also written books about dogs, cats, birds, fish, reptiles and butterflies. The six-page chapter on keeping birds healthy is a common sense, but not too scientific, approach to handling diseased birds.

The 28 colored and 20 black-and-white illustrations are excellent.—[*Finches. By Ian Harman. 138 pages. All-Pets Books, Inc., P.O. Box 151, Fond du Lac, Wis. 1955. Price $4.00.*]—W.A.A.

Public Health Conference

A conference on public health for veterinarians was held at Cornell University, Ithaca, N. Y., on Jan. 3, 1956.

The program included such timely subjects as radiation in food processing and in food animals, cause and prevention of food poisoning from meat foods, changing concepts in epidemiology and communicable disease control, and rabies. The following veterinarians addressed the group: Joe W. Atkinson, U. S. Public Health Service, Washington, D. C.; Donald J. Dean, New York State Health Department, Albany; William A. Hagan, dean, New York State Veterinary College, Cornell University, Ithaca; U. S. Grant Kuhn, III, V.C., U. S. Air Force, A.E.C. Research Program, Oak Ridge, Tenn.; James Lieberman, U. S. Public Health Service, Atlanta, Ga.; and George Poppensiek, New York State Veterinary College, Cornell University, Ithaca.

The conference was sponsored jointly by the U. S. Public Health Service, the New York State Health Department, and the New York State Veterinary College.

Dog Food Manufacturers Meet

The Dog Food Division of the American Feed Manufacturers Association held its first annual meeting in Chicago on Sept. 14 and 15, 1955.

The industry now produces between 30 and 40 million tons of dog food per year. Dr. Hadley C. Stephenson, consultant in the Cornell Research Laboratory for Diseases of Dogs, was one of the principal speakers.

AMONG THE STATES AND PROVINCES

California

North San Joaquin Valley Association.—New officers of the North San Joaquin Valley Veterinary Medical Association are: Robert J. Harris, Turlock, president; Ernest Makino, Tracy, vice-president; and Lyle A. Baker, Turlock, secretary-treasurer.

s/LYLE A. BAKER, *Secretary.*

Colorado

Humane Award Committee Named.—Dr. Donald Mackey, president of the Colorado Veterinary Medical Association has named Drs. Murray Camner, Denver; Joe Green, Boulder; and Lynn Leadbetter, Denver, to the committee charged with selecting the person or persons of Colorado to be awarded for an outstanding act of kindness to animals during 1956. Last year's winners were two teenage girls who rescued a drowning dog.

s/G. H. GILBERT, *Secretary, State V.M.A.*

Personal.—Dr. Paul D. Pattridge, Golden, immediate past-president of the Colorado Veterinary Medical Association, has sold his ranch holdings in Colorado and moved to Batesville, Miss., where he purchased another ranch and hopes to expand his cattle operations in Mississippi where he can take advantage of the longer pasture season.

s/G. H. GILBERT, *Secretary, State V.M.A.*

Delaware

State Association.—The annual meeting of the Delaware Veterinary Medical Association was held in Wilmington on Dec. 7, 1955.

The principal speakers were: Frank Kral, University of Pennsylvania, Philadelphia (dermatomycosis in large and small animals); and Brig. Gen. Wayne O. Kester, V.C., U. S. Air Force, president-elect of the AVMA (AVMA affairs).

At the business session, the folowing officers were elected: L. J. Manogue, Seaford, president; E. F. Waller, Newark, president-elect; and C. A. Woodhouse, secretary-treasurer. The new board members are: M. S. Cover, Newark; W. H. Boyer, Dover; and E. B. Daugherty, Jr., Delmar. A new constitution and bylaws were adopted and a resolution was introduced and passed to lend support to House Bill HR-7225 for voluntary participation of self-employed veterinarians in the Old Age and Survivors Insurance under the Federal Social Security Act. Two new members, T. A. Jeter, Jr., and H. J. Jehnich, Dover, were admitted to the Association.

s/C. A. WOODHOUSE, *Secretary.*

Indiana

Sixth District Association.—The Sixth District (Ind.) Veterinary Medical Association met in Crawfordsville on Nov. 2, 1955. Dr. L. M. Hutchings of Purdue University spoke on brucellosis in cattle and swine. Dr. R. K. Jones, also of Purdue, discussed swine diseases. This was the first of six evening meetings on swine diseases planned for veterinarians by the Department of Veterinary Medicine at Purdue University.

The new officers for 1956 are: Drs. R. W. Hardin, Lebanon, president; Virgil Robinson, Zionsville, vice-president; and Ivan S. Meyers, Kirklin, secretary-treasurer.

s/J. L. KIXMILLER, *Resident Secretary.*

• • •

Tenth District Association.—The Tenth District (Ind.) Veterinary Medical Association met in Muncie on Nov. 17, 1955. Dr. John Dick of Fort Dodge Laboratories, Inc., Fort Dodge, Iowa, spoke on diseases of swine and showed slides of some of the conditions found in diseased animals. The meeting was well attended and a lively discussion followed the talk.

The women were entertained at the home of Mrs. R. H. Goodale of Muncie.

At the December 8 meeting in Newcastle, Mr. Roscoe Clark, of Eli Lilly Co., gave some public relations tips. The following officers were elected: R. S. Ensign, Newcastle, president; Wayne E. Sharp, Union City, vice-president; and R. H. Goodale, Muncie, secretary-treasurer. Dr. W. E. Welbourne, Winchester, was elected a member of the board.

The women enjoyed a Christmas party and exchange of gifts.

s/J. L. KIXMILLER, *Resident Secretary.*

• • •

Northeastern and Wabash Valley Associations.—At a combined meeting of the Northeastern Indiana and Wabash Valley Veterinary Medical Associations, in Huntington on Nov. 9, 1955, Drs. L. M. Hutchings and A. L. Delez of Purdue University spoke at the swine school for veterinarians, which continues three more weeks and was arranged by Dr. Fred Hall of the Purdue University Veterinary Department.

Following a banquet, members and their wives were entertained at the home of Dr. and Mrs. H. W. Demsey of Huntington.

s/J. L. KIXMILLER, *Resident Secretary.*

• • •

Northwestern Association.—The regular meeting of the Northwestern Indiana Veterinary Medical Association was held in Logansport on Dec. 1, 1955. Colonel J. C. Haygood of the Bunker Hill Air Force Base spoke on his experiences while serving in Alaska. The Association officers are Charles F. White, Kentland, president; and John F. Bullard, Lafayette, secretary-treasurer.

Dr. and Mrs. Leo Cahalan and Dr. and Mrs. C. E. Thomas of Logansport were hosts.

s/J. L. KIXMILLER, *Resident Secretary.*

• • •

Wabash Valley Association.—The Wabash Valley Veterinary Medical Association met in Wabash on Dec. 7, 1955. The guest speaker was Mr. J. Nixon, editor of a Wabash newspaper, who told of his recent trip to various countries of South America and showed pictures he had taken.

The following officers were elected: P. C. Clinger, Rochester, president; R. D. Matchett, Converse, vice-president; and E. L. Hill, Marion, secretary-treasurer.

After the business session, members enjoyed singing Christmas carols and an exchange of gifts.

s/J. L. KIXMILLER, *Resident Secretary.*

Kansas

State Association.—The fifty-second annual convention of the Kansas Veterinary Medical Association will be held at the Baker Hotel in Hutchinson on Feb. 5-7, 1956.

The following speakers will address the scientific session: Sidney S. Bjornson, West Fargo, N. Dak. (Respiratory Diseases in Cattle; and Bovine Viral Diseases); H. Lincoln Easterbrooks, Lederle Laboratories, Pearl River, N. Y. (Vibriosis; and Mastitis); Robert C. Glover, Evanston, Ill. (Client Relations and Complaints; and Feline Practice); Harry E. Kingman, Jr. (Public Relations for a State Association); George W. Mather, University of Minnesota, St. Paul (Canine Geriatrics; and Canine Hip Diseases); Mark L. Morris, Topeka, Kan. (Canine and Feline Nutritional Therapy); Newton B. Tennille, Oklahoma A. & M. College, Stillwater (Radiography in General Practice); Frank A. Todd, ARS, U. S. Department of Agriculture, Washington, D. C. (Rinderpest; and Contagious Bovine Pleuropneumonia).

s/K. MAYNARD CURTS, *Secretary.*

Kentucky

State Association.—The annual convention of the Kentucky Veterinary Medical Association in Hardin on Dec. 5-6, 1955, was a highly successful meeting, with more than 100 in attendance.

Outstanding papers were presented by M. K. Heath, Alabama Polytehnic Institute, Auburn, on Feline Practice; W. G. Magrane, Mishawaka, Ind., Diseases of the Eye; George M. Moore, Michigan State University, East Lansing, Bovine Sterility; and T. L. Steenerson, Wilkinson, Ind., Problems of Swine Practice. The program also included interesting presentations by Ronald L. Hectorne, Louisville, on Meat Inspection in Kentucky; E. E. Coshow, ARS, U.S.D.A., and State Veterinarian L. L. Breeck, both of Frankfort, on the brucellosis program in Kentucky.

s/T. J. STEARNS, *Resident Secretary.*

Mississippi

Northwest Association.—The Northwest Mississippi Veterinary Medical Association organized Aug. 14, 1955, has elected the following officers: R. E. Arline, Greenwood, president; Harris N. Cleere, Batesville, vice-president; and Glenn Gates, Clarksdale, secretary-treasurer.

s/HARVEY F. MCCRORY, *Secretary, State V.M.A.*

Missouri

Kansas City Association.—The December 13 meeting of the Kansas City Veterinary Medical Association was held in the Livestock Exchange Building. Dr. I. A. Schipper, University of North Dakota, Fargo, discussed mucosal disease; and a film on rinderpest was shown.

s/BUSCH MEREDITH, *Secretary.*

Nebraska

Death of Mrs. Jenkins.—Mrs. Ann M. Jenkins, 23, wife of Dr. Harold E. Jenkins (KSC

'55), was killed in an automobile accident Dec. 7, 1955. In addition to her husband, who was injured in the crash, Mrs. Jenkins is survived by two small sons.

New Jersey

State Association.—The seventy-second annual meeting of the Veterinary Medical Association of New Jersey will be held Feb. 2-3, 1956, at the Hildebrecht Hotel in Trenton. The sessions will include a scientific program and the election of officers.

On the evening of February 2, members will enjoy a dinner and dance, at which time citations will be made for honored members who have been in practice for more than 50 years. Approximately 200 members and guests will attend the dinner.

s/JOHN R. MCCOY, *Secretary.*

New York

Conference for Veterinarians.—The forty-eighth annual New York conference for veterinarians was held Jan. 4-6, 1956, at the New York State Veterinary College, Cornell University, in Ithaca.

The program listed the following speakers and their subjects: Frank Kral, University of Pennsylvania, Philadelphia (skin conditions associated with internal disorders); David L. Coffin, Angell Memorial Animal Hospital, Boston, (canine skin diseases of endocrine origin); Robert B. McClelland, Buffalo (radiation therapy in dermatology); Louis A. Corwin, Jamaica, Long Island, moderator, Donald W. Baker, David L. Coffin, Robert W. Kirk, staff, Robert B. McClelland, and Charles G. Rickard, staff (clinicopathological panel on skin diseases); Earl J. Catcott, Ohio State University, Columbus (internal examination of the canine eye); Hugh D. Simpson, Iowa State College, Ames (surgery of the lens of the canine eye); Robert W. Kirk, moderator, Earl J. Catcott, Francis H. Fox, staff, Ellis P. Leonard, staff, and Hugh D. Simpson (panel on eye diseases); Floyd Cross, Colorado A. & M. College, Fort Collins, president of the AVMA (sheep diseases); Charles E. Hagyard, Lexington, Ky. (reproductive diseases of mares); Henry P. Noonan, Akron, Ohio (group practice); William F. Stack, Syracuse, and Ellis P. Leonard, James H. Gillespie, Robert W. Kirk, Robert E. May, and Hadley C. Stephenson, staff (panel on problems of the small animal practitioner); Albert L. Brown, New York State Bureau of Animal Industry, Albany, Francesco S. Graziadei, and staff members Philip P. Levine, Clement I. Angstrom, and John R. E. Taylor (role in the new pullorum-testing program and diagnosis of poultry diseases in the field); Christian J. Haller, Avon (infertility in the dairy cow); Arthur V. Bartenslager, Stewartstown, Pa. (reproductive diseases of cattle); and Alvin F. Weber, University of Minnesota, St. Paul (changes in the genital tract of the cow during the estrous cycle and pregnancy).

Other members of the staff of the New York State Veterinary College also participated in the discussions and demonstrations.

s/W. A. HAGAN, *Dean.*

Oregon

State Association.—The winter meeting of the Oregon State Veterinary Medical Association was held at the Multnomah Hotel in Portland, Jan. 27-28, 1956.

The following out-of-state speakers addressed the group: R. D. Radeleff, ARS, Kerville, Texas, Toxicology of Sprays and Insecticides; N. J. Miller, Eaton, Colo., Feedlot Diseases; E. A. Woelffer, Oconomowoc, Wis., Practical Hormone Therapy and Establishing a Sterility Control Program; J. C. Kraft, Seattle, Wash., Small Animal Practice.

Highlights of the program were a panel discussion on small animal diseases by Oregon practitioners and a forum on Association policy covering dispensing, adverse criticism of the profession, and public relations.

s/EDWARD L. HOLDEN, *Secretary.*

Virginia

Central Association.—The officers of the Central Virginia Veterinarians' Association are: B. D. Philpy, Richmond, president; George Brumble, Fredericksburg, vice-president; H. Q. Tucker, Louisa, program chairman; and M. R. Levy, Richmond, secretary-treasurer.

Recent speakers include Frank Kral, University of Pennsylvania, Philadelphia; Lt. Col. T. C. Jones, Armed Forces Institute of Pathology; E. S. Tierkel, U. S. Public Health Service; A. R. Drury, Michigan State University, East Lansing; A. H. Frank, Beltsville, Md.; J. C. Shaw, University of Maryland, College Park; and Drs. W. B. Bell and W. G. Hoag of Virginia Polytechnic Institute.

s/M. R. LEVY, *Secretary.*

DEATHS

Philip R. Allen (ISC '49), 37, Volga, Iowa, died Nov. 29, 1955, the result of a hunting accident. Dr. Allen had served in World War II and had practiced in Parkersburg, Iowa, and in Illinois before going to Volga about two years ago. He is survived by his widow and four children.

★**Ray M. Batchelder** (OSU '32), 52, Holland, Va., died Nov. 5, 1955. After receiving his D.V.M. degree, Dr. Batchelder served as a parasitologist with Hess and Clark, Inc., as a graduate assistant at Ohio State University, and as instructor at the State College of Rhode Island. He served in the Veterinary Corps during World War II, attaining the rank of major. At the time of his death, he was professor of animal pathology at the Virginia Agricultural Experiment Station, Virginia Poly-

technic Institute, and was engaged in research on parasites of swine. He was active in community and professional affairs and was a member of the Virginia Veterinary Medical Association and the AVMA. Dr. Batchelder is survived by his widow.

★**Walter A. Brown** (OSU '06), 70, Gahanna, Ohio, died Nov. 17, 1955. Dr. Brown had practiced in Columbus from 1907 until his son, Dr. Walter W. Brown, received his D.V.M. degree in 1947 and took over the practice. He was a member of the Ohio State Veterinary Medical Association and of the AVMA to which he was admitted in 1916. Dr. Brown is survived by his widow, three daughters, his son, and eight grandchildren.

★**Stanley R. Cooper** (OSU '41), 37, West Hollywood, Calif., died Nov. 21, 1955. Dr. Cooper was active in civic and professional activities. He was a member of the California Veterinary Medical Association and of the AVMA.

★**James A. Flanigan** (WSC '20), 72, Eugene, Ore., died Nov. 25, 1955. Dr. Flanigan was a member of the Oregon Veterinary Medical Association and of the AVMA.

★**Leigh T. Giltner** (COR '06), 71, Washington, D. C., died Nov. 17, 1955. Dr. Giltner retired from the Agricultural Research Service in 1954, after a career of 48 years in the U. S. Department of Agriculture.

Dr. Giltner was assistant chief of the Animal Disease and Parasite Research Branch, ARS, from 1932 until he retired. He was the author of nearly 50 scientific papers dealing with research progress in animal disease. Dr. Giltner was a member of the AVMA, having joined the Association in 1911. He is survived by his widow, a daughter, and a son.

★**George A. Hawthorne** (KCV '18), 66, Clarinda, Iowa, died Nov. 9, 1955. For many years, Dr. Hawthorne was recognized as an outstanding practitioner, a dependable association worker, and a fine citizen. Because of heart trouble, which finally caused his death, he retired from active practice several years ago and was employed by the state in disease control work. He was a member of the Iowa Veterinary Medical Association and of the AVMA, to which he was admitted in 1918. His widow, Irene B. Hawthorne, survives.

★**John C. Hunt** (ONT '08), 69, Klamath Falls, Ore., died Oct. 12, 1955. Dr. Hunt served as a captain in the Veterinary Corps, U. S. Army, during World War I, and had practiced in Ohio and Illinois before coming to Klamath Falls. He was a member of the Oregon Veterinary Medical Association and was made a life member of the AVMA in 1954. Dr. Hunt is survived by his widow, a daughter, and two grandchildren.

★**Ashe Lockhart** (KCV '15), 65, Kansas City, Mo., died Jan. 11, 1956. An obituary will be published in a subsequent issue of the JOURNAL.

★**John E. Macho** (WSC '44), 35, Hamilton, Mont., died Sept. 28, 1955, as the result of an automobile accident. Dr. Macho, a general practitioner, was a member of the Montana Veterinary Medical Association and of the AVMA.

★**Evan L. Moul** (OSU '36), 56, Rock Island, Ill., died Nov. 13, 1955. Dr. Moul, a general practitioner, was a member of the Illinois Veterinary Medical Association and of the AVMA. He is survived by his widow.

★**Harry W. Orr** (ISC '18), 59, Stillwater, Okla., dean of the School of Veterinary Medicine, Oklahoma A. & M. College, died Jan. 14, 1956. An obituary will appear in the Feb. 15, JOURNAL.

Christian A. Sotaaen (McK '09), 81, Windom, Minn., died Sept. 11, 1955. Dr. Sotaaen was a general practitioner.

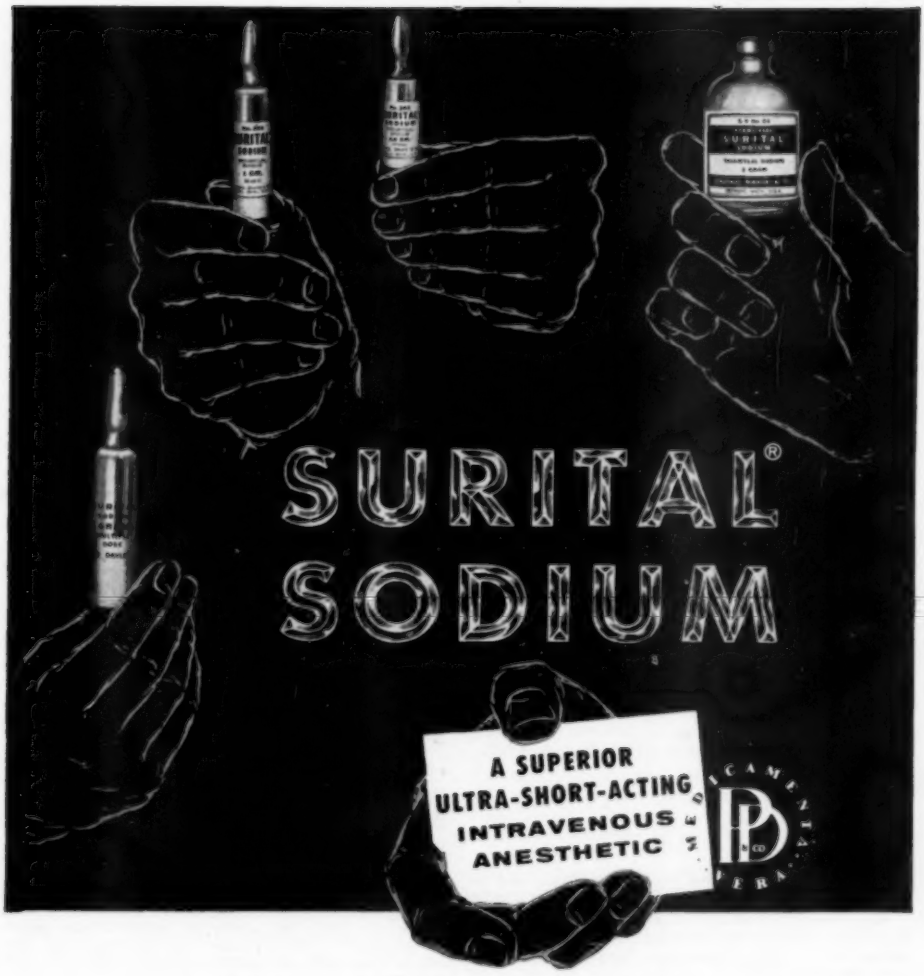
Albert E. Stettler (OSU '16), 65, Newark, Ohio, died Oct. 21, 1955. Dr. Stettler had served for several years as city meat inspector for Newark. He had also served as state veterinarian for Georgia and was for many years associated with the Columbus, Ohio, City Board of Health.

★**William W. Stimson** (UP '55), 25, Bantam, Conn., died in an automobile accident on Sept. 24, 1955. Dr. Stimson, who had been associated in practice with Dr. Harold H. Gardner since receiving his D.V.M. degree, was a member of the AVMA. He is survived by his widow and one child.

★**Percy R. Talbot** (ONT '07), 73, Edmonton, Alta., died July 31, 1955. Dr. Talbot engaged in practice until 1912 when he was appointed Alberta provincial veterinarian. This post, along with a lectureship in veterinary science at the University of Alberta, he held until his retirement in 1947. An authority on Alberta's early history, Dr. Talbot was the author of "Veterinarians of Alberta's Early Days." He was honorary president and life member of the Alberta Veterinary Medical Association and was made a life member of the AVMA in 1952.

★**Clarence E. Taylor** (WSC '34), 43, San Francisco, Calif., died Nov. 28, 1955. Dr. Taylor served in the Veterinary Corps for five years during World War II, attaining the rank of major. He then returned to his work in the Bureau of Livestock Disease Control, was field veterinarian for one year, and then was appointed supervising veterinary livestock inspector in charge first of the San Luis Obispo and then the San Francisco district. He was active in professional activities and at the time of his death was president of the Bay Counties Veterinary Medical Association. He was admitted to the AVMA in 1938. Dr. Taylor is survived by his widow, a son, and a daughter.

★Indicates members of the AVMA.



The use of SURITAL in animals has shown that induction is smooth and rapid and is free of excitement or irritability or undesirable side reactions.

SURITAL SODIUM (THIAMYLAL SODIUM, PARKE-DAVIS) IS SUPPLIED:

0.2 Gm., 0.3 Gm., 0.5 Gm., 1.0 Gm., 5.0 Gm., and 10.0 Gm. ampoules (Nos. 261, 262, 263, 264, 265, 266); 0.5 Gm. and 1.0 Gm. ampoules with ampoules of Water for Injection, U.S.P.; 1.0 Gm., Steri-Vials (No. 64) (rubber-diaphragm-capped vials); 1.0 Gm. Steri-Vials with ampoules of Water for Injection, U.S.P.

PROFESSIONAL LITERATURE AVAILABLE ON REQUEST

Department of Veterinary Medicine

PARKE, DAVIS & COMPANY

DETROIT 32, MICHIGAN

ORGANIZATION SECTION

Kodachrome Slides Available

The AVMA is pleased to cooperate with the Armed Forces Institute of Pathology in making additional visual aids available to members on a loan basis. A set of 76 2 by 2 kodachrome slides showing gross and microscopic lesions of rinderpest has been placed in the AVMA film library for distribution upon request. This set is accompanied by a commentary for each of the slides. There is no charge for the use of the material except the payment of shipping costs. Members requesting slides should allow sufficient time for confirmation of their order before scheduling their use.

Similar sets of slides dealing with other important livestock disease problems are being prepared and will be available in the near future.

WOMEN'S AUXILIARY

President—Mrs. Earl N. Moore, 636 Beall Ave., Wooster, Ohio.
Secretary—Mrs. F. R. Booth, 3920 E. Jackson Blvd., Elkhart, Ind.

Memorial Fund.—At the 1954 meeting of the Women's Auxiliary to the AVMA in Seattle, Wash., Mrs. Guy Graham of Kansas City, Mo., suggested that a memorial fund be established to augment the Student Loan Fund which is sponsored by the Women's Auxiliary. Mrs. Graham was appointed chairman of a committee including Mrs. F. M. Bolin, Fargo, N. Dak., and Mrs. Myron G. Fincher, Ithaca, N.Y., to draft proposals for this fund.

The following proposals were adopted and became effective at the Minneapolis meeting, in August, 1955:

1) A Memorial Fund is to be established to augment the Student Loan Fund.

2) This fund is to be made up from contributions given in memory of deceased veterinarians or members of their family, and gift legacies.

3) These gifts are to be sent directly to the treasurer of the Women's Auxiliary to the AVMA, all checks to be made payable to the Memorial Fund of the Women's Auxiliary to the AVMA.

4) Upon receipt of memorial gift checks, the treasurer will send a card to the family of the deceased, notifying them of the gift, and a card of acknowledgement to the donor.

All checks should be sent to our treasurer, Mrs. John D. Stevens, P.O. Box 5, Sequim, Wash.

News stories have been distributed to veterinary publications announcing, the establishment of the Memorial Fund (see JOURNAL, Jan. 1, 1956: 48).

These gifts to the Memorial Fund will further veterinary education and will constitute a lasting memorial to the deceased.

s/MRS. F. M. BOLIN.

APPLICATIONS

Applicants—Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative Bylaws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., the names of applicants residing within the jurisdictional limits of the constituent association shall be published once in the JOURNAL.

The following applicants have been certified as members of the constituent association that has jurisdiction over the area in which the applicant resides. This certification was made by the secretary of the constituent association in accordance with Section 2, Article X, of the Administrative Bylaws.

CLARK, ARODD W.
7418 Laurel Canyon Blvd., North Hollywood, Calif.
D.V.M., Colorado A. & M. College, 1951.

VINE, LOUIS L.
P.O. Box 503, Chapel Hill, N. Car.
D.V.M., Middlesex University, 1944.

Applicants—Not Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative Bylaws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., notice of all applications from applicants residing outside of the jurisdictional limits of the constituent associations, and members of the Armed Forces, shall be published in the JOURNAL for two successive months. The first notice shall give the applicant's full name, school, and year of graduation, post office address, and names of his endorsers.

First Listing

WAINRIGHT, CHARLES R.
2154-1 S.U., Ft. Lee, Virginia.
D.V.M., Texas A. & M. College, 1937.
Vouchers: E. L. Watson and J. A. McCallam.

Graduate Applicants

The following are graduates who have recently received their veterinary degree and who have applied for AVMA membership under the provision granted in the Administrative Bylaws to members in good standing of student chapters. Applications from this year's senior classes not received in time for listing this month will appear in later issues. An asterisk (*) after the name of a school indicates that all of this year's graduates have made application for membership.

Second Listing

University of Georgia*

TAFF, CLYDE W., D.V.M., Box 389, Rt. 2, Buena Vista Rd., Columbus, Ga.

Texas A. & M. College

LACOUR, RAY M., D.V.M., Box 21, Abbeville, La.

STUDENT CHAPTER ACTIVITIES

Cornell Chapter.—At the October 11 meeting of the Cornell University Student Chapter of the AVMA, Dr. H. C. Stephenson, professor emeritus of small animal diseases, entertained the group with an amusing commentary of his recent trip to Europe and showed colored

(Continued on p. 20)

Vesical Calculi in Cats

A valuable new study by Robert L. Stansbury, D.V.M. and Roger W. Truesdail, Ph.D.

(Originally published in THE NORTH AMERICAN VETERINARIAN, Vol. 36, No. 10, October, 1955. Reprints available without charge, as explained below.)

Practitioners in the small animal field will welcome the results of this long and careful study of the occurrence of vesical calculi in cats receiving different diets. The project began with an analysis of five-year case records of cats in the Arroyo Animal Hospital, Pasadena, California. Thereafter, a group of 75 cats were observed under strictly controlled conditions for thirty-three months. They were separated into groups, fed different diets, and watched carefully for incidence of vesical calculi.

Of the group of cats fed exclusively on Puss 'n Boots Cat Food from commercial packs, *not one developed a true vesical calculi*. Cystic calculi were recovered from two cats fed on fresh horsemeat and dietary supplements of fresh liver, milk, vitamin B_1 and D, and calcium.

The authors conclude that "no valid scientific conclusions can be drawn as to the causes of the formation of vesical calculi in cats". The details of the study leading to this judgment will be of great interest to every practitioner.

Reprints Available Without Charge

If you missed the original article in the NORTH AMERICAN VETERINARIAN, the makers of Puss 'n Boots Cat Food will be glad to send you a free reprint. Just write, on your professional letterhead, to

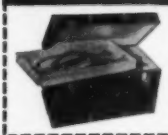
Coast Fisheries, Division of The Quaker Oats Company, Wilmington, California

PUSS'n BOOTS

America's largest selling cat food . . . adds the plus in health, beauty, vigor.

NICHOLSON

veterinary equipment news



durable, metal sheathed instrument/serum cases

Baked black enamel over steel with brass trim. 5 standard models; light weight, yet built to take knocks! See folder N-1 for sizes, prices.

new do-it-yourself Plasti-Plated cages

Before you buy cages, write for folder N-2 on our amazing new Plasti-Plated kennels. Rock-hard, glass-smooth, seamless surfaces. Inexpensive, easy to do-it-yourself!

electric "B" dairy cow branding iron

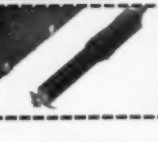
Heats in 90 seconds, makes a clean brand, weighs only 11 ounces. T and V brands available too. Uses 110 v. current, won't smoke. Write for folder N-3.

new! clear plastic cases for your glass syringes

Keep syringes sterile, clean in these light, unbreakable plastic cases. Covers for 5, 10 and 20 cc. syringes, $5.75 set, folder N-4 gives details.

new! plastic sign letters for your hospital

Our new selection of beautiful weatherproof plastic signs will dress-up your office or clinic. All sizes, colors; easily installed. Write for folder N-5.



hi-current electric firing iron

Most modern, up-to-date way to fire horses, remove warty growths, ear polypi, tumors. Complete with 11 points/tips. Write for folder N-6.

☐ folder N-1 cases ☐ folder N-2 Plasti-Plate ☐ folder N-3 "B" irons

☐ folder N-4 syringe cases ☐ folder N-5 sign letters ☐ folder N-6 firing irons

Please send me the folders I've checked above.

DVM

street

city

Nicholson Manufacturing, Inc.

2440 East Third Avenue Denver 6

clip and mail today

(STUDENT CHAPTER ACTIVITIES—*continued from p. 18*)

slides he had taken. On October 25, John Haynes, as representative of the Chapter, reported on the AVMA convention in Minneapolis; William Sumner, representative to the New York State V.M.A. meeting, reported on that convention; Dr. J. K. Bosshart, Camden, N. Y., spoke to the group concerning his experiences in general practice.

At the November 8 meeting, Dr. Richard E. Shope, of the Rockefeller Institute for Medical Research, spoke on etiology of certain virus diseases. Dr. Georg Jenny of the School of Veterinary Medicine, University of Pennsylvania, at the November 29 meeting, discussed fracture repair and illustrated his talk with motion pictures showing various fractures and their treatment.

The annual Christmas party was held December 16 at the Bethel Grove Community Center.

s/DOROTHY NIELSEN, *Secretary.*

• • •

Minnesota Chapter.—At the November 2 meeting of the University of Minnesota Student Chapter of the AVMA, Dr. R. Leland West of Waseca spoke on the problems of general practice. The Chapter has started a newsletter which will be issued quarterly to the alumni.

The annual Christmas party was held December 2.

s/D. C. SWACINA, *Secretary.*

• • •

Ohio Chapter.—At the November 2 meeting of the University of Ohio Student Chapter of the AVMA, the following large animal practitioners presented a panel discussion: Drs. S. L. Saylor, Canal Winchester; W. H. Pavey, Xenia; and S. E. Peterson, Wilmington. Dr. D. O. Jones, of the University staff, was moderator.

Dr. Richard Rainer, Pique, and Dr. Frank Coy, Cleveland, were guest speakers at the November 19 meeting. They discussed general practice.

Richard C. Piper of Cleveland was the recipient of the 1955 Borden Award ($300), as the member of the graduating class to maintain the highest point hour average in his first three years in veterinary medicine. Keeth Kraner and Richard C. Piper were awarded the $500 Lederle Laboratory research scholarships on the basis of scholastic standing.

s/LOWELL E. RIPLEY, *Secretary.*

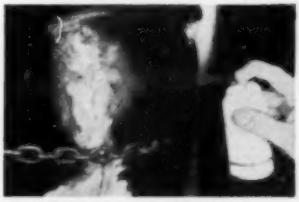
Bats and whales, like migratory birds, may travel thousands of miles with the change of seasons.—*Sci. News Letter, Nov. 5, 1955.*

New dressing procedures using

Aeroderm® LIQUID SPRAY-ON BANDAGE

"make possible superior results of surgery considered hazardous only a few years ago."[1]

TEAT SURGERY—After teat wall is closed, wound is sprayed with Aeroderm. Plastic dressing is also used to seal the flange of teat cannula in place.[1]



PROLAPSE OF THE VAGINA—Surgical closure of upper portion of vulva with wire sutures is dressed with Aeroderm, minimizing fecal contamination during healing.[1]

TAIL SURGERY—Docked tail of 4-month-old pup is dressed with Aeroderm to avoid injury by licking and to keep wound clean. (Photo courtesy Dr. R. E. Miller, Richmond, Indiana.)

Two or three light coats of Aeroderm are sprayed directly onto the aseptic wound, allowing a few seconds for drying between coats. The tough, flexible, transparent film which forms guards against infection and abrasion while tissues repair normally. Aeroderm is impermeable to bacteria and outside contaminants. Aeroderm forms a protective coating to prevent excoriation by body discharges and promote healing of abraded areas.

A few of the many applications[1,2,3,4] of Aeroderm are shown at the left. In large animals, Watts[2] reports "satisfactory results" in rumenotomies, urethrotomies, cesarean sections, herniorrhaphies and teat surgery. In small animals, Wendt[3] reports "the opportunity for introduction of infection is held to a minimum" in burns, surgical wounds and excoriation.

Aeroderm is sterile and can be taken on calls conveniently. Cost of dressing as applied is about ½ cent per square inch.

1. Conner, G.H.: Vet. Med. 50:259 (June) 1955.
2. Watts, R.E.: J.A.V.M.A. 125:40 (July) 1954.
3. Wendt, W. E.: Personal communication (Sept.) 1954.
4. Choy, D.S.J., and Wendt, W.E.: U.S. Armed Forces M.J. 3:1241 (Sept.) 1952.

Supplied in 6-oz. aerosol-type dispenser.
Available through your veterinary supply dealer.

Send for literature and further information

AEROPLAST CORPORATION 420 Dellrose Avenue
Dayton 3, Ohio

COMING MEETINGS

Louisiana State University. Annual conference for veterinarians. Louisiana State University, Baton Rouge, Jan. 31-Feb. 1, 1956. W. T. Oglesby, head, Department of Veterinary Science, Louisiana State University, Baton Rouge, La.

Connecticut Veterinary Medical Association. Annual meeting. Hotel Bond, Hartford, Conn., Feb. 1, 1956. E. H. Patchen, 289 New Haven Ave., Milford, Conn., secretary.

Veterinary Medical Association of New Jersey. Annual meeting. Hildebrecht Hotel, Trenton, N. J., Feb. 2-3, 1956. John R. McCoy, Rutgers University, New Brunswick, N. J., secretary.

Texas Veterinary Medical Association. Annual meeting. Baker Hotel, Mineral Wells, Texas, Feb. 5-7, 1956. Paul B. Blunt, 710 Maverick Bldg., San Antonio, Texas, executive secretary.

West Virginia Veterinary Medical Association. Winter meeting. Greenbrier Hotel, White Sulphur Springs, W. Va., Feb. 19-20, 1956. D. A. Munro, West Virginia University, Morgantown, W. Va., secretary.

Missouri Veterinary Medical Association. Annual meeting. Kansas City, Mo., Feb. 20-21, 1956. Paul L. Spencer, P.O. Box 283, Jefferson City, Mo., secretary.

Illinois State Veterinary Medical Association. Annual meeting. Hotel LaSalle, Chicago, Ill., Feb. 20-22, 1956. C. B. Hostetler, 1385 Whitcomb Ave., Des Plaines, Ill., secretary.

Colorado A. & M. College. Conference for veterinarians. Glover Veterinary Hospital, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., Feb. 20-22, 1956. O. R. Adams, Department of Veterinary Clinics and Surgery.

Missouri Veterinary Medical Association. Annual meeting. Hotel Continental, Kansas City, Mo., Feb. 20-21, 1956. Paul L. Spencer, P.O. Box 283, Jefferson City, Mo., secretary.

Alabama Veterinary Medical Association. Annual meeting. Whitley Hotel, Montgomery, Ala., March 18-20, 1956. M. K. Heath, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, Ala., secretary.

Washington, State College of. Annual conference for veterinarians. College of Veterinary Medicine, State College of Washington, Pullman, Wash., April 2-4, 1956. John R. Gorham, conference chairman.

American Animal Hospital Association. Annual meeting. Hotel Fontainebleu, Miami Beach, Fla., May 23-26, 1956. W. H. Riser, 5335 Touhy Ave., Skokie, Ill., executive secretary.

Maryland State Veterinary Medical Association. Annual summer meeting. George Washington Hotel, Ocean City, Md., June 28-29, 1956. John D. Gadd, Cockeysville, Md., secretary.

Pennsylvania State Veterinary Medical Association. Annual meeting. Bedford Springs Hotel, Bedford, Pa., Sept. 12-14, 1956. Raymond C. Snyder, N.W. Corner Walnut St., and Copley Rd., Upper Darby, Pa., secretary.

American Veterinary Medical Association. Annual meeting. Municipal Auditorium, San Antonio, Texas, Oct. 15-18, 1956. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Foreign Meetings

World Congress on Fertility and Sterility. Naples, Italy, May 18-26, 1956. Professor T. Bonadonna, Via Monte Ortigara, 35, Milan, Italy, in charge of Veterinary Section.

Tenth International Congress of Entomology. McGill University and University of Montreal, Montreal, Canada, Aug. 17-25, 1956. J. A. Downes, Division of Entomology, Science Service Bldg., Ottawa, Ont., Canada, secretary.

International Association of Hydatidology. Sixth Congress. Athens, Greece, Sept. 14-18, 1956. Prof. B. Kouriss, 1 MacKenzie King St., Athens, Greece, general secretary.

(*Continued on p. 24*)

My HISTACOUNT Bookkeeping System
really saves me work . . .
In just minutes, I get a complete financial picture of my practice
. . . day by day . . . every day.
See for yourself what a work-saver Histacount is
. . . mail the convenient coupon today . . . no obligation.
MAIL COUPON TODAY
PROFESSIONAL PRINTING COMPANY, INC.
HYDE PARK, N. Y.
Gentlemen: Please send free Histacount Bookkeeping samples and literature, no obligation on my part.
Dr
Address

How our 26 years of experience can help you in your job

You have them every day. Broken bones. Homesick pups. Or fearful boys who place their confidence in you. All troubles that you alone can resolve.

Sometimes they call for good common sense, a sense that has taught you to be gentle with a sick animal . . . or a heartsick young master. Sometimes they call for all the technical knowledge you have built up through the years in your profession. And each is a very personal thing that requires your utmost skill.

But there are other things essential to your profession that research must provide. And there, Doctor, is where we place our 26 years of experience behind you.

We have studied the dietary needs of dogs for more than a quarter of a century. We have developed palatable and completely nourishing Ken-L-Ration, Ken-L-Biskit, and Ken-L-Meal. And we also supply Chappel Horse Meat as a prime dietary supplement.

You can feed and prescribe Ken-L-Products with complete confidence, for you will be sure of healthy dogs and satisfied patrons.

Ken-L-Products are known and accepted as quality foods by millions of dog owners and can be purchased anywhere in the nation.

Ken-L-Products A Division of
THE QUAKER OATS COMPANY, CHICAGO

QUALITY DOG FOODS FOR OVER 26 YEARS

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Association, the first Thursday of each month. G. J. Phelps, Jr., Montgomery, Ala., secretary.

Jefferson County Veterinary Medical Association, the second Thursday of each month. W. R. Laster, Jr., 213 N. 15th St., Birmingham, Ala., secretary.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. Keith T. Maddy, Phoenix, Ariz., secretary.

Pima County Veterinary Medical Association, the third Wednesday of each month in Tucson. E. T. Anderson, 8420 Tanque Verde Rd., Tucson, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. E. T. Anderson, Rt. 2, Box 697, Tucson, Ariz., secretary.

CALIFORNIA—Bay Counties Veterinary Medical Association, the second Tuesday of each month. E. Paul, Redwood City, Calif., secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Wilfred Pimentel, 3455 S. Elm Ave., Fresno, Calif., secretary.

East Bay Veterinary Medical Association, bimonthly, the fourth Wednesday. John T. Turver, 1201 E. 12th St., Oakland 6, Calif., secretary.

Kern County Veterinary Medical Association, the first Thursday evening of each month. B. C. Watson, 825 14th St., Bakersfield, Calif., secretary.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. W. H. Rockey, P. O. Box 121, San Luis Obispo, Calif., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 90 Corral de Tierra, Salinas, Calif., secretary.

Northern San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month. Lyle A. Baker, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month at 8:00 p.m. in Antlers Hotel, San Bernardino, Calif. Jay C. Wallis, 112 N. Girard St., Hemet, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month. Donald E. Lind, 2643 N. Main St., Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. T. D. Harris, San Mateo, Calif., secretary.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. Robert E. Clark, Napa, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. W. E. Steinmetz, 4227 Freeport Blvd., Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. H. R. Rossoll, 1795 Moore St., San Diego, Calif., secretary.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at Eaton's Restaurant in Studio City, Calif. R. A. Button, 5954 Van Nuys Blvd., Van Nuys, Calif., secretary.

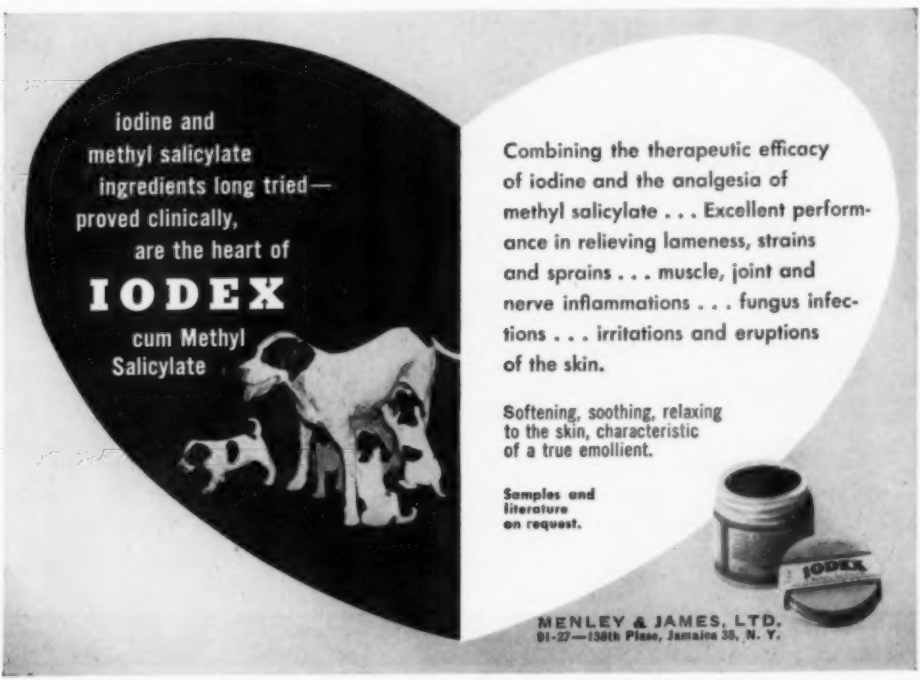
Southern California Veterinary Medical Association, the third Wednesday of each month. Howard C. Taylor, 2811 West Olive St., Burbank, Calif., secretary.

Tulare County Veterinarians, the second Thursday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

COLORADO—Northern Colorado Veterinary Medical Society, the first Monday of each month. M. A. Hammarlund, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Association,

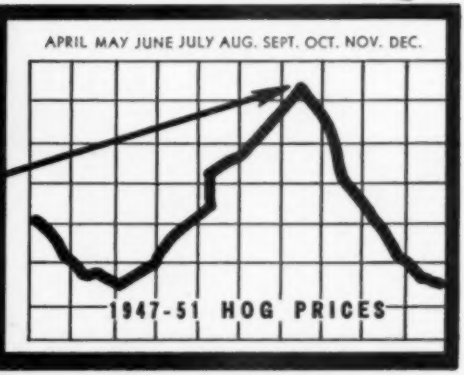
(*Continued on p. 26*)


iodine and
methyl salicylate
ingredients long tried—
proved clinically,
are the heart of
IODEX
cum Methyl
Salicylate
Combining the therapeutic efficacy of iodine and the analgesia of methyl salicylate . . . Excellent performance in relieving lameness, strains and sprains . . . muscle, joint and nerve inflammations . . . fungus infections . . . irritations and eruptions of the skin.
Softening, soothing, relaxing to the skin, characteristic of a true emollient.
Samples and literature on request.
IODEX
MENLEY & JAMES, LTD.
91-27—138th Place, Jamaica 35, N. Y.

PRESCRIBE for *Profits*, too!

℞
VITAMINERAL "A to Z"
MINERAL SUPPLEMENT
WITH ANTIBIOTICS

HELP YOUR CLIENTS GET THESE TOP PRICES!



Prescribing "A to Z" to help cure nutritional deficiencies in backward, poor-doing hog litters is just *one* way to use this proven feed supplement. "A to Z" has also been valuable to hog feeders as a way of building better, bigger hogs for less . . . and getting them to an earlier, higher market. That's why you can recommend "A to Z" for:

- **Earlier weaning at heavier weights**
- **Raising more uniform litters**
- **Increased daily gains . . . earlier marketing**
- **Savings on feed costs per 100 lbs. gain**
- **Profitable marketing of runts, laggards, orphans**

A complete "A to Z" hog feeding program . . . from creep to finish . . . is outlined in the 22nd edition of the VpC FEED BOOK. *Write for it today!*

SOLD TO VETERINARIANS ONLY

VITAMINERAL
PRODUCTS COMPANY
PEORIA 3, ILLINOIS

DEPENDABLE SUPPLEMENT FEEDS SINCE 1916

the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. E. J. Hathaway, Clifton Park Manor, Apt. 73-5, Wilmington 2, Del., secretary.

FLORIDA—Jacksonville Veterinary Medical Association, the second Thursday of each month, time and place specified monthly. L. D. Barrett, Rt. 8, Box 572, Jacksonville, Fla., secretary.

South Florida Veterinary Society, the third Tuesday of each month, at the Seven Seas Restaurant, Miami, Fla. E. D. Stoddard, 6432 S. W. 8th St., Miami, Fla., secretary.

GEORGIA—Atlanta Veterinary Society, the second Tuesday of every month at the Elks Home on Peachtree St., Atlanta, Ga. J. L. Christopher, Smyrna, Ga., secretary.

ILLINOIS—Chicago Veterinary Medical Association, the second Tuesday of each month. Mark E. Davenport, Jr., 215 S. Edgewood Ave., LaGrange, Ill., secretary.

Eastern Illinois Veterinary Medical Association, the first Thursday of March, June, September, and December. A one-day clinic is held in May. R. P. Link, College of Veterinary Medicine, University of Illinois, Urbana, Ill., secretary.

INDIANA—Central Indiana Veterinary Medical Association, the second Wednesday of each month. Charles J. York, P. O. Box 1656, Indianapolis 6, Ind., secretary.

Michiana Veterinary Medical Association, the second Thursday of each month, at the Hotel LaSalle, South Bend, Ind. L. D. Ramsay, 719 E. Jefferson Ave., La Porte, Ind., secretary.

Tenth District Veterinary Medical Association the third Thursday of each month. W. E. Sharp, Union City, Ind., secretary.

IOWA—Cedar Valley Veterinary Association, the second Monday of each month, except January, July, August, and October, at Black's Tea Room, Waterloo, Iowa. D. A. Buchanan, Grundy Center, Iowa, secretary.

Coon Valley Veterinary Association, the second Wednesday of each month, September through May, at the Bradford Hotel, Storm Lake, Iowa. D. I. Lee, Sac City, Iowa, secretary.

Fayette County Veterinary Association, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant, West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

KENTUCKY—Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month in Louisville or within a radius of 50 miles. Dr. W. E. Bewley, P. O. Box "H", Crestwood, Ky., secretary.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m. at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Harry L. Schultz, Jr., 9011 Harford Rd., Baltimore, Md., secretary.

MICHIGAN—Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert E. Kader, 5034 Armstrong Rd., Lansing 17, Mich., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. S. Correll, Rt. 1, Midland, Mich., secretary.

Southeastern Veterinary Medical Association, the fourth Wednesday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Rd., Detroit 5, Mich., secretary.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of the month (except July and August) at the Sheraton Hotel, Spring Ave. and Lin-

(*Continued on p. 28*)

here's the economy balling gun for dispensing to your clients

When you want to leave a balling gun with a client, you can't dispense a gun that costs you $3 or $4. That is why we had this economy model made. Made just for dispensing, it's a regular one-ounce size, standard 16½ inch gun. Singles cost $1.90; six, $10.85; and a dozen, $20.45. Order by number please.

JSA-3935, economy balling gun, six for $10.95.

Jen-Sal

Jensen-Salsbery Laboratories, Inc.
Kansas City, Missouri

advanced instrument designs for advanced veterinary surgery

For oral and intrauterine administration.

Pfizer Tetracycline-Vet Bolus

Effective broad-spectrum antibiotic therapy and prophylaxis of systemic, intestinal, and intrauterine infections.

500 mg. of tetracycline hydrochloride per tablet.

Ideal for dispensing.

Supplied, foil-wrapped, in boxes of five.

Sold only to veterinarians

Department of Veterinary Medicine Pfizer PFIZER LABORATORIES, Brooklyn 6, N. Y. Division, Chas. Pfizer & Co., Inc.

(COMING MEETINGS—*continued from p. 26*)

dell Blvd. Allen B. Shopmaker, 136 N. Meramec, Clayton 5, Mo., secretary.

Kansas City Small Animal Hospital Association, the first Monday of each month, at alternating hospitals. W. F. Noland, 7504 Metcalf, Overland Park, Kan., secretary.

Kansas City Veterinary Medical Association, the third Tuesday of each month at Exchange Hall, ninth floor, Livestock Exchange Bldg., 1600 Genessee St., Kansas City, Mo. Busch Meredith, 800 Woodswether Rd., Kansas City 5, Mo., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April at the Academy of Medicine, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Milburn Ave., Maplewood, N. J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Casa Mana in Teaneck, N. J. Edward Baker, 568 Grand Ave., Englewood, N. J., secretary.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel in Greensboro, N. Car. R. T. Copeland, 1800 Walker Ave., Greensboro, N. Car., secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month. John D. Baker, Goldsboro, N. Car., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month at 7:00 p.m. in Mull's Motel in Hickory, N. Car. W. W. Dickson, Box 1071, Gastonia, N. Car., secretary.

OHIO—Cuyahoga County Veterinary Medical Association, the first Wednesday of each month, September through May (except January), at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. Ed. R. Jacobs, 5522 Pearl Rd., Cleveland, Ohio, secretary.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month except July and August. Carl L. Clark, 127 N. W. 23rd St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brookside State Bank, Tulsa, Okla. Merle S. Watts, 5302 E. 11th St., Tulsa, Okla., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine, 39th and Woodland Ave., Philadelphia 4, Pa. Raymond C. Snyder, 39th and Woodland Ave., Philadelphia 4, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. J. Marvin Prewitt, 4141 Lexington Blvd., Corpus Christi, Texas, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Tuesday of each month in the Trinity Episcopal Church, 8th and James St., Seattle, Wash. P. R. Des Rosiers, 5508 2nd Ave., N. W., Seattle 7, Wash., secretary.

(*Continued on p. 32*)

Jen-Sal

small animal
therapy note

new! Jen-Sal's Cycloderm in a free-flowing lotion

New lotion formula of Jen-Sal's already outstanding external fungicide attacks fungi effectively by deep and rapid penetration of hair follicles. Odorless, non-staining, non-irritating Cycloderm Lotion can be dispensed for dry eczemas or ringworm to the complete satisfaction of you and your clients. Packaged in cartons of six – one oz. plastic squeeze bottles with slip-off labels.

Jensen-Salsbery Laboratories, Inc.
Kansas City, Missouri

This sack contained the secret of an even finer FRISKIES!

Unique kennels put research on a practical basis with outstanding results

"FREM 293" identifies by code number one of countless experimental dog food formulas tested at the Friskies Research Kennels on the famous Carnation Farms. When tests prove conclusively the value of such a formula change, you get the result in an even finer Friskies.

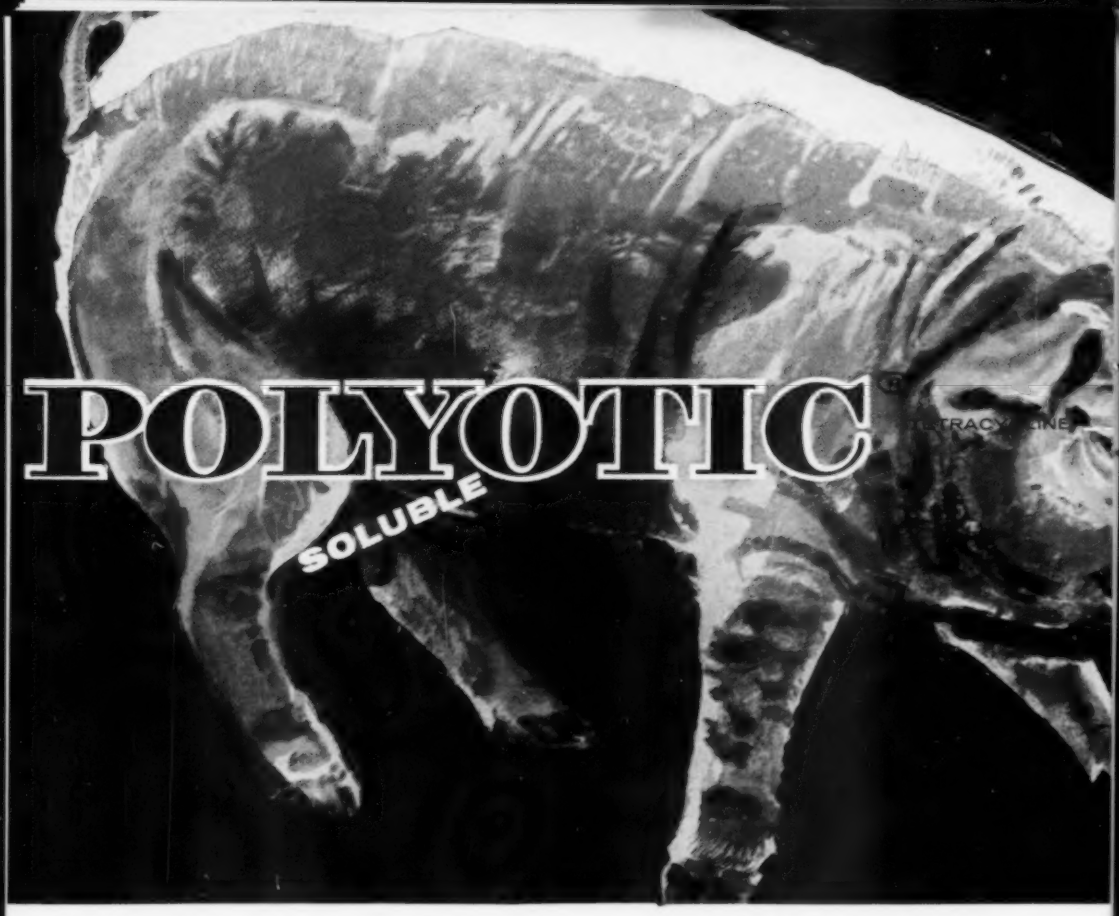
THIS IS PRACTICAL RESEARCH. More than 100 dogs of various ages, breeds and sizes undergo tests covering maintenance, palatability, reproduction and consistency.

FRISKIES is as fine a dog food as money can buy. For a *moist* feeding, add water to Friskies Meal. Friskies Cubes may be fed *dry*. Both are equally nutritious... either may be fed alone as a complete diet assuring every food element dogs are known to need. For variety, feed both Friskies Meal and Cubes... builders of champions.

Friskies

ALBERS MILLING CO., DIV. OF
CARNATION COMPANY
LOS ANGELES 36, CALIFORNIA

Sold in 50, 25, 10, 5 and 2-lb. sizes



■ FOR

AVAILABLE TO VETERINARIANS ONLY | LEDERLE PROFESSIONAL LINE

Lederle LEDERLE LABORATORIES DIVISION AMERICAN CYANAMID COMPANY PEARL RIVER, NEW YORK

PIG AND CALF SCOURS

Your clients will like the easy-to-administer feature of this ideal dispensing item. You will like the consistent results obtained from the routine use of this newest of the broad-spectrum antibiotics, first introduced to the veterinary profession by Lederle.

Available in: 1/4-lb.; 1/2-lb.; 1 lb. and 5 lb. jars.

OLYOTIC INTRAMUSCULAR:
100 mg.-500 mg.-1.0 Gm.-5.0 Gm.
OLYOTIC INTRAVENOUS: 100 mg.-2.5 Gm.
OLYOTIC OBLETS®: 4's-6 x 4's
OLYOTIC CAPSULES: 50 mg., 25's-100's; 100 mg., 100's; 250 mg., 16's-100's
OLYOTIC TABLETS: 50 mg., 25's-100's; 100 mg., 25's-100's; 250 mg., 16's-100's
OLYOTIC MASTITIS OINTMENTS ¼ oz.
OLYOTIC COMPOUND MASTITIS OINTMENT: ¼ oz.
OLYOTIC OPHTHALMIC OINTMENT 1%: 6 x ⅛ oz.
OLYOTIC TOPICAL OINTMENT 3%: 1 oz.
OLYOTIC SOLUBLE (Tinted) POWDER:
¼ lb.-½ lb.-1 lb.-5 lb.
VIANIZED® RABIES VACCINE: (Canine):
1 dose-5 x 1 dose-10 doses
VIANIZED RABIES VACCINE: (Cattle): 10 doses

AVIANIZED CANINE DISTEMPER VACCINE:
1 dose-10 x 1 dose
ANTI-CANINE DISTEMPER SERUM AND ANTI-INFECTIOUS CANINE HEPATITIS SERUM: 20 cc., 100 cc.
INFECTIOUS CANINE HEPATITIS VACCINE: 2 cc.-10 cc.
BRUCELLA ABORTUS VACCINE: 1 dose-5 x 1 dose-5 doses (25 cc.)
FELINE DISTEMPER VACCINE: 1 immunization (2 vials Vaccine, 2 vials Sterile Diluent, 2 cc.)
ANTI-FELINE DISTEMPER SERUM: 50 cc.
CARICIDE® Diethylcarbamazine TABLETS:
400 mg., 25's
DIETHYLSTILBESTROL SOLUTION: 10 cc.-50 cc.
LEPTOSPIRA CANICOLA-ICTEROHEMORRHAGIAE BACTERIN
Whole Culture Inactivated Vacuum-Dried
Other products to be added.

Laboratory Service for Veterinarians

VETERINARY DIAGNOSTIC LABORATORIES

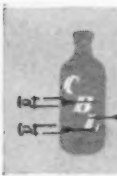
These laboratories have been established to aid veterinarians in the diagnosis of obscure as well as common ailments in large and small animals. The chief aim of our staff is to give quick and accurate diagnosis at all times.

Our service includes fecal examinations, antibiotic sensitivity tests, urinalyses, blood counts, tissue sections, bacteriological cultures, cultures for ringworm and blood chemistry. It is designed to assist owners and breeders of stock of all kinds including dogs, cats, horses, cattle, poultry, hogs and sheep.

Sample containers and price list on request.

VETERINARY DIAGNOSTIC LABORATORIES

220 East 23rd St., New York 10, N.Y.



Corn Belt Laboratories, inc.

EAST ST. LOUIS, ILLINOIS

The Veterinarians' Institution

(COMING MEETINGS—*continued from p. 28*)

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. Jo Walker, Agriculture Experiment Station, Puyallup, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W., Huntington, W. Va., secretary.

WISCONSIN—Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. George F. Lynch, 201 West Devon St., Milwaukee 17, Wis., secretary.

HISTACOUNT®

For Doctors... Printing and Patients' Records

PROFESSIONAL PRINTING CO., INC.
NEW HYDE PARK, N. Y.

In the long fight against mastitis, a long step forward . . .

MASTRICOMB

Trademark

with papain

25 Gm. disposable plastic syringe

papain *to pave the way*

mastricomb *to do the job*

procaine penicillin G	1 million units
dihydrostreptomycin	500 mg.
sulfamerazine	750 mg.
sulfathiazole	750 mg.
papain	50 mg.
cobalt sulfate	5 mg.

in a base which has been especially formulated for long-lasting effect through slow release of the active ingredients.

Also available: MASTRICOMB (without papain) and MASTRICOMB-750 (containing 750,000 units of penicillin, 200 mg. of dihydrostreptomycin, 750 mg. each of sulfamerazine and sulfathiazole, and 5 mg. of cobalt sulfate.)

DVM

DRUGS FOR VETERINARY MEDICINE, INC. P. O. Box 6676, Denver 16, Colorado

gentle, gentle COMFORT
Arnold RED OIL LINIMENT

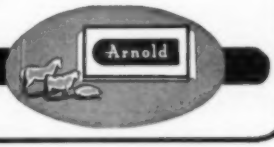
for relief of CAKED and SWOLLEN UDDERS and other common inflammatory conditions

A potent, general purpose liniment formulated with Camphor, Wintergreen, Turpentine, Chloroform, and Scarlet Red in a special oil base. Give your clients an opportunity to compare this product with bag balms and watch your dispensing practice grow.

Write — Phone — Wire for Immediate, Careful Shipment

PACKAGED in units of 350 cc. Attractive discounts when purchased in quantities of six or more. ORDER NOW!

ARNOLD LABORATORIES
NEW CASTLE, INDIANA



An Authorized Binding for

JOURNAL of the American Veterinary Medical Association
American Journal of Veterinary Research

Arrangements have been made by the American Veterinary Medical Association for subscribers to have their journals bound into distinctively designed books.

Twelve issues, January through December, bound in best grade black washable buckram, imprinted with your name on cover, cost but $3.45 per volume.

Ship journals parcel post. Within thirty days after receipt, bound volumes will be shipped prepaid anywhere in the U.S.A. Full remittance must accompany order.

Bound journals serve as an immediate reference for research and information.

Publishers Authorized Bindery Service
NEW ADDRESS — 5809 W. Division St., Chicago 6, Ill.

CLASSIFIED ADVERTISEMENTS

Personal Want Ads—$4.00 for the first 25 words and 10 cents for each additional word; 35 cents for use of box number.

Commercial Want Ads—$5.00 for the first 25 words, 25 cents for each additional word.

Remittance must accompany ad.

Deadlines for Want Ads

***For JOURNAL dated 1st of month* — 8th of month preceding date of issue.**

***For JOURNAL dated 15th of month* — 22nd of month preceding date of issue.**

Names of classified advertisers using key letters can not be supplied. Address your reply to the key letters, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be transmitted to the advertiser.

Wanted—Veterinarians

Public health veterinarians, permanent position immediately available in San Diego Health Department; M.P.H. degree and one year recent public health experience required. Monthly salary, $532—$587. Write County Civil Service, Room 402 Civic Center, San Diego, Calif.

Basic science department of veterinary school has instructorship or assistant professorship in teaching and research permitting study toward M.S. or Ph.D. Send resumé of training and experience. Address "Box C 2," c/o JOURNAL of the AVMA.

Graduate veterinary assistant wanted for small animal hospital in Chicago, south side. State qualifications, give complete personal data and salary expected. Address "Box C 4," c/o JOURNAL of the AVMA.

Wanted, able worker experienced and qualified for research, development and production of veterinary pharmaceuticals. Genuine opportunity for right man. Give full particulars. Address "Box C 8," c/o JOURNAL of the AVMA.

Wanted—Positions

Position wanted, capable veterinarian completely experienced with small animals; completing military obligations, separating from Walter Reed Army Institute of Research. With one of largest small animal practices 5 years; taught veterinary clinical surgery and medicine 5 years; had previous business, sales, and administrative experience. Laboratory animal husbandry at Walter Reed. Licensed in California, New York, New Jersey. Address "Box C 1," c/o JOURNAL of the AVMA.

Experienced veterinarian, currently in one-man practice that can not develop into partnership size, desires situation in group or partnership practice, or commercial, permitting some "living time." New York license. Would require time to dispose of practice and property. Address "Box C 5," c/o JOURNAL of the AVMA.

(Continued on p. 36)

SELF FILLING SYRINGE

The multi-injector's third hand

Another accurate smooth working ground glass barrel — leak proof metal plunger instrument with many possibilities. Adjustable for any capacity. By attaching one end of a rubber tube to the self-filling syringe and the other to a bottle of serum or vaccine any number of quick 1/4cc to 5cc accurate dose injections can be made. The instrument is operated with one hand. Anyone who injects a large number of animals will find the Self-Filling Syringe will pay for itself both in labor and serum saved after the first day's use.

Sizes 2cc and 5cc

Literature upon request

Inquire at your nearest veterinary dealer or wholesaler about this new improved outstanding product.

Boston Instrument Mfg. Co. Inc., 50 Thayer Street, Boston 18, Mass.

An important new idea in Distemper-Hepatitis Immunization

distemper hepatitis

sin-jex

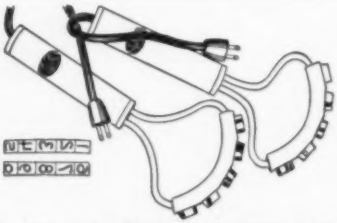
vaccine

Sin-jex **is the first Distemper-Hepatitis vaccine to utilize a vacuum dried *modified live virus* distemper fraction, with killed virus hepatitis fraction as diluent. *Sin-jex* gives more positive immunity against distemper: because the modified live virus distemper fraction elicits a more marked immunity response. *Sin-jex* is instantly reconstituted because of the R_L "reconsti-quick" feature. *Sin-jex* is a fine homogenous suspension which passes easily through a 22 guage needle. *Sin-jex* is easily administered with a single subcutaneous injection. *Sin-jex* may be given simultaneously with or without Anti-Canine Distemper-Infectious Hepatitis Anti-Serum. *Sin-jex* produces immunity in less than two weeks. *Sin-jex* may be used before or after weaning.**

Research Laboratories, Inc.
St. Joseph, Missouri

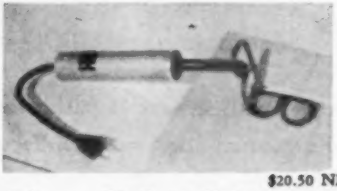
Available from

INDEPENDENT ETHICAL DISTRIBUTORS
selling to Licensed Veterinarians only
*TRADE MARK



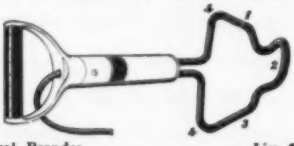
The letters are 7/8 inch, the most popular size. List Price of set, $69.50.

The New L & H All Purpose Electric Brander will brand any object that burns.
The price on Brander is $35.00. Letters or figures are $1.00 each, list.



$20.50 NET

It's Safe . . . . No flame eliminates fire hazard—Completely insulated.
It's Fast . . . Heats Red Hot in 90 seconds! Quicker Heat Recovery—No Time Lost.



Universal Brander ..... List $42.50
1) 3 in. Bar; 2) 2 in. half circle; 3) 4 in. Bar; 4) corners may be used as running iron.

Dehorner, without handle 29.50
Dehorner, with handle ..... List 32.50

It's Simple . . .
Plugs into any 110 volt outlet or Standby generator. The tubular Rod type element is non-corrosive and self cleaning.

Write for Brochure

SALES TO VETERINARIANS ONLY
Pat. No. 2514613 Manufactured for

NELSON LABORATORIES
Veterinary Specialties
404 EAST 12th ST., SIOUX FALLS, S. DAK.

In Superficial Fungous Infections In Animals
Use **Desenex®**
OINTMENT • POWDER • SOLUTION

Effectively Anti-mycotic • Non-sensitizing
Non-irritating • Anti-pruritic

Samples and literature sent on request.

Maltbie
MALTBIE LABORATORIES DIVISION
WALLACE & TIERNAN INC.
25 MAIN ST., BELLEVILLE 9, NEW JERSEY, U.S.A.
PD-53

(CLASSIFIED ADS—*continued from p.* 34)

Veterinarian, two years of experience, married wants position leading to partnership or purchase of mixed practice in Connecticut or New York. Address "Box C 9," c/o JOURNAL of the AVMA.

Married graduate, 1954, seeks permanent position in mixed or small animal practice in southeast, preferably Carolinas or Virginia. Available July 1, after Army separation. Address "Box C 10," c/o JOURNAL of the AVMA.

Wanted—Practices

Graduate of AVMA-approved college desires dairy practice, either partnership or percentage basis, with opportunity for partnership or purchase. Address "Box C 6," c/o JOURNAL of the AVMA.

Veterinarian desires to purchase large animal practice, or position with opportunity for future ownership or partnership. Prefer Middlewest or West. Married; age 28. Address "Box C 11," c/o JOURNAL of the AVMA.

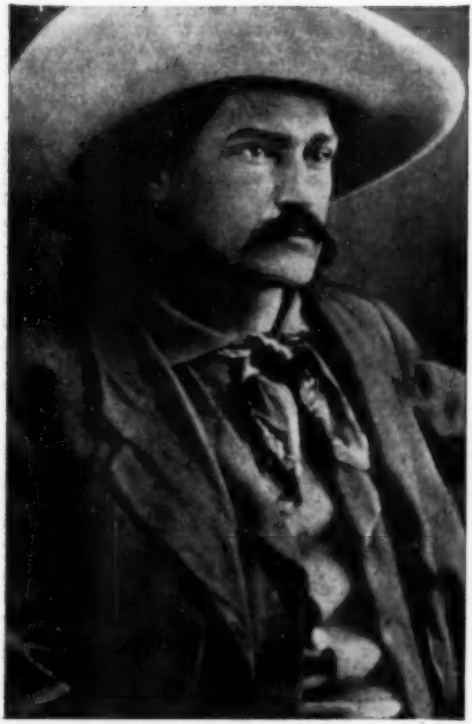
For Sale or Lease—Practices

Large animal practice, real estate, and equipment for sale. Small town in western Minnesota; price $15,000. Address "Box C 3," c/o JOURNAL of the AVMA.

Established small animal hospital with separate living quarters, in southern California, for lease with option to buy. Address "Box C 7," c/o JOURNAL of the AVMA.

(*Continued on p.* 38)

BROKEN TEETH
—repaired in bottom clipper blades. Top and bottom blades sharpened to match. Save money—Guaranteed. Prices on Request
HIGHLY SPECIALIZED SHARPENING
Sales—Repairing on Oster and Stewart clippers.
Sharpened Blades Tested on Rabbit Fur
OSTER A 2 $7.75 STEWART $1.00
Prompt Service—Est. 17 years
MAIL TO
CLIPPER SERVICE OAK RIDGE NEW JERSEY



His calling card had claws on it

LUTHER KELLY lied about his age and got into the army at 15. They sent him West in 1865, and he stayed.

He liked the wilderness. Game abounded. In Trappers' Lake, "trout were so thick they obscured the bottom."

Hostile Indians were also pretty thick. But when two tried ambushing him, he killed both with his Henry .44.

He learned Sioux and sign language, read Shakespeare and Scott.

One day, he visited General Miles, sending a huge fierce-clawed bear's paw to Miles' tent as his calling card. Miles made him chief army scout against the Sioux.

But by 1885, the country was taming down, and Yellowstone Kelly left it.

Two decades later, Teddy Roosevelt praised the heroic treasurer of Surigao in the Philippines who saved the town from outlaws. Name: Luther S. Kelly.

Yellowstone Kelly's body now rests at Kelly Mountain in Montana. But his restless, pioneering spirit lives on in today's America. For it is the trail-blazing courage of 165 million people that makes America great, and that provides the real strength behind one of the world's finest investments: our country's Savings Bonds.

Why not guard your security with this strength? Invest in U. S. Series E Savings Bonds. And hold on to them!

It's actually easy to save money—when you buy Series E Savings Bonds through the automatic Payroll Savings Plan where you work! You just sign an application at your pay office; after that your saving is done *for* you. The Bonds you receive will pay you interest at the rate of 3% per year, compounded semiannually, when held to maturity. And *after* maturity they go on earning 10 years *more*. Join the Plan today. Or invest in U. S. Savings Bonds regularly where you bank.

Safe as America—
U. S. Savings Bonds

The U.S. Government does not pay for this advertisement. It is donated by this publication in cooperation with the Advertising Council and the Magazine Publishers of America.

Piggy-Lix

The modern method of supplying iron, vitamins and trace minerals to suckling pigs.

Includes all essential factors in effective proportions for the prevention and treatment of nutritional anemia and deficiencies.

In plastic squeeze bottle with oral applicator tip for appeal in dispensing and ease in dosing.

One squirt (appx 1 cc) is average dose. Insert tip at corner of mouth and squirt into pounch of jowl. Repeat weekly until weaned.

Packaged in counter display carton of 12 — 100cc.

doz. 100cc.....9.00—6 doz.....48.00

Pharmaceutical Manufacturers to the Veterinary Profession · Since 1918

CURTS *laboratories*
FORMERLY CURTS-POLSY
KANSAS CITY, KANSAS

(CLASSIFIED ADS—*continued from p. 36*)

Miscellaneous

For Sale—Small animal mouth speculums. Used primarily to pass the stomach tube in dogs and cats; self-retaining, made of life-lasting plastic. Instructions included. Set of 2, $6.00. J. & G. Mfg. Co., 1585 Moore St., Akron 1, Ohio.

Breedersleve—The disposable obstetrical sleeve. Package of 20 with detachable chest band, $5.00; lower wholesale prices. Free sample upon request. Breeders Equipment Co., Flourtown, Pa.

For Sale—Aloe x-ray machine, radiographic and fluoroscopic unit, 50 ma., 85 kv.p.; movable automatic bucky in table and a type-B fluoroscopic screen; in excellent condition. Price $950. Address W. J. Rongaus, M.D., 601 Thompson Ave., Donora, Pa., telephone 66.

Discount house prices! One dozen 2-cc. syringes, $7.50. Write for catalog on syringes, needles, medical supplies. Jackson, 1709 Oak St., Santa Monica, Calif.

Send for FREE 36-page Treatise on
CARROT OIL VITAMINS

Details the advantages of carrot oil vitamins when used in feeds to improve breeding results; to destroy oxidized milk flavors; and to promote general good health and glossy coats. Contains much information. Replete with data and references. Send for it today

NUTRITIONAL RESEARCH ASSOCIATES
Dept. 251-M. South Whitley, Indiana

A MESSAGE TO VETERINARIANS

BUY ONLY an X-ray outfit designed exclusively for veterinary use. Don't make the mistake of buying an X-ray unit for use on the human body.

X-RAY ANIMAGRAPH

TRADE MARK REG. U. S. PAT. OFF.

U. S. Patent No. 2323704

A complete X-ray examination of the human body requires both Fluoroscopy and Radiography.

No Army, Navy or civilian hospital X-ray Department is complete without Fluoroscopy and Radiography.

If Fluoroscopy is a necessity for these hospitals, it is equally necessary for Animal Hospitals.

CAMPBELL X-RAY CORP.
110 Cummington St., Boston 15, Mass.

Kindly send me descriptive information, including prices and terms, on the Campbell X-Ray Animagraph, designed for safety and convenience of veterinarians.

Dr. .....
(Please Print)

Address .....

.....
(City and State)

Terramycin®

Brand of oxytetracycline

A broad-spectrum antibiotic with a firmly established record of successful therapy in veterinary medicine. Rapidly effective in combating infections caused by **gram-positive** and **gram-negative bacteria, rickettsiae,** and **some large viruses.** There is a dosage form to meet all requirements of administration and of dispensing.

TERRAMYCIN INTRAVENOUS
vials of 250 mg., 500 mg., 1 Gm., and 2.5 Gm. with Water for Injection, U.S.P.†

TERRAMYCIN INTRAMUSCULAR
vials of 100 mg., 1 Gm., and 5 Gm.†

TERRAMYCIN TABLETS
500 mg., scored, foil-wrapped. Folders of 2. Boxes of 5.†

TERRAMYCIN OINTMENT
5 mg. of oxytetracycline and 10,000 units of polymyxin B sulfate per Gm. Tubes of 1 oz.

30 mg. of oxytetracycline and 10,000 units of polymyxin B sulfate per Gm. Tubes of 1 oz.†

TERRAMYCIN CAPSULES
50 mg. in bottles of 25 and 100;
100 mg. in bottles of 10, 25, and 100;
250 mg. in bottles of 8, 16, and 100.

TERRAMYCIN OPHTHALMIC OINTMENT
5 mg. of oxytetracycline and 10,000 units of polymyxin B sulfate per Gm. Tubes of ⅛ oz.

TERRAMYCIN POULTRY FORMULA
25 Gm. of oxytetracycline activity per lb.
Bottles of 1.6 oz., ½ lb., and canisters of 10 lb.

TERRAMYCIN SUSPENSION IN OIL
25 mg. of oxytetracycline per cc. Bottles of 500 cc.

TERRAMYCIN ANIMAL FORMULA FOR MASTITIS
30 mg. of calcium dioxytetracycline and 10,000 units of polymyxin B sulfate per Gm. Tubes of ½ oz. Bottles of 150 cc.†

TERRAMYCIN ANIMAL FORMULA SOLUBLE POWDER
25 Gm. of oxytetracycline activity per lb. Bottles of ¼ lb., ½ lb., and 1 lb., and canisters of 5 lb. and 10 lb.

TERRAMIX®-5
5 Gm. of oxytetracycline activity per lb.
Canisters of 5 lb.†

TERRAMIX®-10
10 Gm. of oxytetracycline activity per lb.
Canisters of 5 lb.†

and a complete line of antibiotics, hydrocortisone, and other specialties. ®TRADEMARK

†Sold only to veterinarians.

Pfizer Discoverer of Terramycin and Tetracycline

Department of Veterinary Medicine, PFIZER LABORATORIES, Division, Chas. Pfizer & Co., Inc., Brooklyn 6, N. Y.

Compare

PRICE

Compare

RESULTS

and you will always

Prescribe

MASTICS®

ACTUAL SIZE
THE ORIGINAL
UDDER BOUGIE

MASTICS P&S

100,000 units penicillin
50,000 mcg. dihydrostreptomycin

MASTICS act fast because medication in high concentration is quickly dispersed throughout the quarter. Improvement often noted in 12 hours.

MASTICS contain no grease, no wax, no insoluble materials to remain in the udder retarding antibiotic action. MASTICS milk out completely—produce no residue on the strainer.

MASTICS are so effective, cows are returned to the herd more promptly with less loss of production.

LOW IN COST...HIGH IN POTENCY
MASTICS SAVE TIME, MONEY, MILK

WRITE FOR SAMPLES AND PRICES

The Martin Laboratories
West Chester, Penna.

M·A·C

Quick relief for Bone, Bursal or Tendon Lameness

Single Bottle.....$2.00
3 and 1 free.....5.00
6 and 2 free.....9.00
12 and 4 free.....17.00
24 and 4 free.....28.00

CARTER-LUFF CHEMICAL CO.
Hudson, N. Y.

Index to Advertisers in This Issue

Aeroplast Corporation	21
Affiliated Laboratories Corporation	11
Armour Veterinary Laboratories	12
Arnold Laboratories	33
Ashe Lockhart, Inc.	3rd Cover
Associated Veterinary Laboratories, Inc.	6-7
AVMA Symbol	14
Boston Instrument Mfg. Co., Inc.	34
Campbell X-Ray Corp.	38
Carter-Luff Chemical Co.	40
Classified Advertisements	34
Clipper Service	36
Corn Belt Laboratories, Inc.	32
Corn States Laboratories, Inc.	2nd Cover
Curts Laboratories	38
Drugs for Veterinary Medicine, Inc.	32
Fort Dodge Laboratories, Inc.	5, 16
Fromm Laboratories, Inc.	13
Friskies Dog Foods	29
Haver-Glover Laboratories	42
Jensen-Salsbery Laboratories, Inc.	26, 28, 4th Cover
Ken-L Products	23
Lederle Laboratories	30, 31
Martin Laboratories	40
Massengill Company, S. E.	8, 9
Menley & James, Ltd.	24
Nelson Laboratories	36
Nicholson Manufacturing, Inc.	20
Norden Laboratories	1
Nutritional Research Associates	38
Parke, Davis & Company	17
Pfizer Laboratories	27, 39
Pitman-Moore Company	3
Professional Printing Company, Inc.	22, 32
Publishers Authorized Bindery Service	33
Puss 'n Boots Cat Food	19
Research Laboratories, Inc.	35
Veterinary Diagnostic Laboratories	32
Vitamineral Products Company	25
U.S. Chemical Co.	15
U.S. Savings Bonds	37
Wallace & Tiernan, Inc.	38
Williams & Wilkins Company	41

Topley & Wilson's

"No other text dealing with bacteriology remotely approaches this one for completeness and the excellence of presentation."

(New York State J. Med., May 1947)

PRINCIPLES OF BACTERIOLOGY AND IMMUNITY

4th Edition

By G. S. Wilson, M.D., F.R.C.P., D.P.H., and A. A. Miles, C.B.E., M.A., M.D., F.R.C.P.

CONTENTS

I. General Bacteriology
II. Systematic Bacteriology
III. Infection and Resistance
IV. Application of Bacteriology to Medicine and Hygiene

2 vols. 2390 pp.
196 tables
303 figs. $24.50

Encyclopedic in scope, this "bacteriologic Bible" has been called indispensable by the British Medical Journal. The new edition, 300 pages longer than the last, has been thoroughly revised and brought up to date. New material includes studies on variation in bacteria, bacteriophages and viruses, phenomena of recombination and transduction that have opened up the new field of bacterial genetics; advanced knowledge of cellular morphology, cellular metabolism and virus production; new chemotherapeutic and antibiotic agents.

Clear, readable style, common sense approach, a full index duplicated in both volumes and comprehensive chapter bibliographies are among the book's valuable assets. There is increased emphasis on the bacteriology of infection in man and animals in this new edition.

THE WILLIAMS & WILKINS COMPANY

Mt. Royal and Guilford Avenues **Baltimore 2, Maryland**

Please send me the new 4th edition of Topley and Wilson's PRINCIPLES OF BACTERIOLOGY AND IMMUNITY. I enclose full payment to save postage and handling charges.

NAME _____

ADDRESS _____

JAVMA 2-1-56

NEW anthelmintic in powder and liquid form that can be given to ALL animals.. of any age!

PIPCIDE
PIPSOL

the up to date approach to rid animals and poultry of profit robbing parasites.

Realize numerous advantages from these anthelmintics:

1. Worm pigs of any age — baby pigs to pregnant sows.
2. Preliminary fasting is not necessary.
3. There is a wide range between therapeutic and toxic dosage.
4. Pipcide and Pipsol are water soluble. Animals may be treated individually, in drinking water, or in wet or dry feed.
5. Swine heavily parasitized or with irritated intestinal tracts can be successfully treated with little danger to the host.

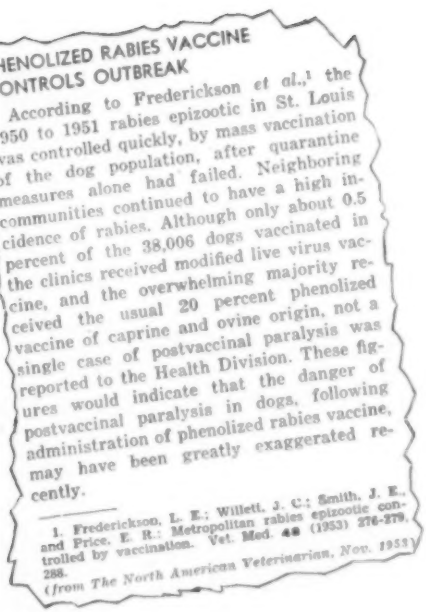
These are but a few of the advantages given your clients when dispensing Pipcide or Pipsol.

HAVER-GLOVER *Laboratories*
KANSAS CITY, MO.

See HAVER-GLOVER MESSENGER for formula and price.

RABIES VACCINE

(Lockhart)



PHENOLIZED RABIES VACCINE CONTROLS OUTBREAK

According to Frederickson *et al.*,[1] the 1950 to 1951 rabies epizootic in St. Louis was controlled quickly, by mass vaccination of the dog population, after quarantine measures alone had failed. Neighboring communities continued to have a high incidence of rabies. Although only about 0.5 percent of the 38,006 dogs vaccinated in the clinics received modified live virus vaccine, and the overwhelming majority received the usual 20 percent phenolized vaccine of caprine and ovine origin, not a single case of postvaccinal paralysis was reported to the Health Division. These figures would indicate that the danger of postvaccinal paralysis in dogs, following administration of phenolized rabies vaccine, may have been greatly exaggerated recently.

1. Frederickson, L. E.; Willett, J. C.; Smith, J. E., and Price, E. R.: Metropolitan rabies epizootic controlled by vaccination. Vet. Med. **48** (1953) 276-279, 288.

(from The North American Veterinarian, Nov. 1953)

Experience —

The article at left as news is not new. It is timely only because it is human nature to seek the sensational, and overlook tried and time-proven methods. Phenolized rabies vaccine has been used as an efficient control measure for many years.

Efficiency —

Immunity developed by phenolized rabies vaccine (for a practical period of time) is as good as that from any other rabies vaccine, as reported by the Public Health Service.

Effort —

Throughout the years Lockhart has tried to have adequate supplies of Rabies Vaccine available for immediate shipment at all times. Even during the stress of the unprecedented demand upon the industry during the 1954 vaccination season, no one was without vaccine of Lockhart manufacture.

Emphasis— Lockhart Rabies Vaccine

is produced by veterinarians — sold only to veterinarians

ASHE LOCKHART, INC. • 800 WOODSWETHER ROAD, KANSAS CITY 5, MO.

higher
blood calcium levels
that stay high
longer
with

DCM

SPECIAL CONCENTRATION

DCM SPECIAL CONCENTRATION contains new and vastly superior calcium salts never before used in a similar intravenous product, making possible higher blood calcium and magnesium levels for longer periods.

A free-flowing solution, DCM SPECIAL CONCENTRATION is low in toxicity and almost neutral in pH for minimum tissue irritation.

Given intravenously, subcutaneously or intraperitoneally, DCM SPECIAL CONCENTRATION provides optimum calcium levels at only ½ cc. per pound of body weight.

DCM
Supplied
in cartons
of twelve
500 cc. vials
Specify
"Special Concentration"
on your order

Jen-Sal

JENSEN-SALSBERY LABORATORIES, INC.
KANSAS CITY, MISSOURI